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STREPSIPTERA

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INSECTORUM**

DIRIGÉS PAR

P. WYTSMAN

STREPSIPTERA

by W. DWIGHT PIERCE

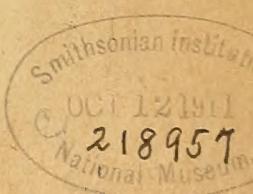
WITH 4 COLOURED PLATES AND 1 PLAIN PLATE

1911

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INTRODUCTION

HERE has been much discussion and disagreement among Entomologists concerning the systematic position of the Strepsiptera. The genus *Xenos* was described by Rossi in 1790 1), and placed by him near *Ichneumon*, and the genus *Stylops* was described by Kirby in 1802 2). In 1813 3) Kirby grouped these two genera together to form the order Strepsiptera. His decision was not accepted by many excellent students and the group has since then been assigned every rank from tribe to order, and has been included in the Diptera, Neuroptera and Coleoptera. In 1872 4) Saunders monographed the group under the family name *Stylopidae*, considering them as Heteromerous Coleoptera. His classification recognized six tribes and eight genera with twenty-five species. In 1909 5) the present writer revised the group under the ordinal name given by Kirby, and recognized four superfamilies, eight families, thirty-seven genera and one hundred and nine species. The present contribution recognizes five superfamilies, ten families, thirty-seven genera and one hundred and thirty-seven species.

The order belongs among the Endopterygota Holometabola, but differs from the Coleoptera by having the mesothorax and metathorax free, the metathorax greatly produced, and the head free, but not on distinct neck; and differs from the Neuroptera, Trichoptera, Mecoptera, Lepidoptera, Diptera and Hymenoptera by having the thoracic segments not agglutinate, but resembling them in the other characters by which it is separable from the Coleoptera.

1) *Fauna Etrusca, Mant. Ap&p.* p. 114 (1790).
2) *Monographia Apium Angliae*, Vol. 2, pp. 112, 113 (1802).
3) *Trans. Linn. Soc. Lond.*, Vol. 11, pp. 86-122 (1813).
4) *Trans. Ent. Soc. Lond.* pp. 1-48 (1872).
5) *Bull. U. S. Nat. Mus.* no 66 (1909).

Order STREPSIPTERA, Kirby

Strepsiptera. Kirby (order), Trans. Linn. Soc. Lond. Vol. 11, pp. 109-112 (1813).

Phthiromyæ. Latreille (tribe 3, Diptera), Gen. Crust. Ins. Vol. 4, p. 388 (1807).

Rhipidoptera. Lamarck (family, Diptera), Anim. s. Vert. Vol. 3, pp. 348-352 (1816).

Rhipiptera. Latreille (order), in Cuvier, Règne Anim. Ins. (1817).

Rhiphiptera. Leach (order), Zool. Misc. Vol. 3, p. 135 (1817).

Strepsiptera. Gegenbaur (family, Neuroptera Trichoptera) (1827).

Stylopidae. Stephens (family, Coleoptera Heteromera), Syst. Cat. Brit. Ins. Vol. 1, p. 403 (1829).

Stylopidae. Shuckard (family, Neuroptera), in Swainson, Nat. Hist. Arrang. Ins. pp. 163, 351-353 (1840).

Stylopites. Newman (tribe, Coleoptera), The Zoolologist, Vol. 3, p. 949 (1845).

Stylopides. Lacordaire (family, Coleoptera). Gen. Col. Vol. 2, pp. 634-641 (1859).

Stylopidae. Saunders (family, Coleoptera), Trans. Ent. Soc. Lond. pp. 1-48 (1872).

Strepsiptera. Sharp (family, Coleoptera Heteromera). Encycl. Britt. (9th ed.), Vol. 13, pp. 148, 149 (1881).

Strepsiptera. Brauer (family, Coleoptera Malacodermata), Sitz.-Ber. Akad. Wiss. Wien, Vol. 91, pp. 335, 377, 378 (1885).

Stylopinæ. Lameere (subfamily, Coleoptera Melandryidæ), Ann. Soc. Ent. Belg. Vol. 44, p. 370, 377 (1900).

Xenidæ. Semenov (family, Coleoptera Tenebrionoidea), Rev. Russe d'Ent. Vol. 2, pp. 258-262 (1902).

Strepsiptera. Pierce (redefined as an order), Proc. Ent. Soc. Wash. Vol. 9, pp. 75-85 (1908).

Strepsiptera. Pierce (monograph of order), Bull. U. S. Nat. Mus. no. 66 (1909).

The above references contain the principal synonymy, but there are many other quotations under several of these names which may be found in full by reference to the last quoted paper.

Characters of the order. — An order of hypermetamorphic endoparasitic insects with highly specialized reduction of certain functional organs, great specialization of other functional organs, and with dissimilar sexes.

Male. — Elytrophorous, winged, ephemeral. Head and thoracic segments united by elastic commissures. Head transverse, with eyes stalked and composed of regularly placed separated hexagonal ommatidia. Mouth parts specialized, rudimentary, vestigial, or lacking. Labrum and labium absent; pharynx presenting a great exposed surface which is folded crater-like and contracts into a small tube distant from the appendages; mandibles and maxillæ arising beneath the genæ near their base; maxillæ more or less reduced. Antennæ sensitive, with one or more joints laterally produced. Thorax with principal parts capable of independent movement, united by elastic commissures. Prothorax much reduced; mesothorax reduced; metathorax greatly elongated, occupying at least one-half the length of the body and apically covering the base of the abdomen. Front coxal cavities open behind; tarsal claws absent, except in Mengoidea. The legs are unfit for use, except in adhering to the body of the female's host during copulation, which is the only function of the males. Halteres, or balancers, attached very low on the mesopleuræ and not serving as a protection to the wings, deformed and greatly reduced. The mesostigmata are frequently protected by a lobe-like process beneath the base of each elytron. Wings folded longitudinally; veining simple, radial. Genitalia with œdeagus exposed, arising at tip of ninth segment; ninth segment ventrally surpassing tenth, at the tip of which is the anus.

Female. — Larviform, apodous, permanently endoparasitic, inclosed by the persistent skin of the pupa. Pupa larviform, apodous. Head and thorax adnate, forming an acariform chitinized disk, separated by a constriction from the sac-like abdomen. This disk, the cephalothorax, protrudes from between

the abdominal segments of the host, with the oral or ventral surface upwards. Mouth parts vestigial. Eyes lacking. Thorax separated ventrally from the head by the opening of the brood-canal, an intermembranal conduit between the pupal and adult skins leading from the unpaired median genital apertures on the second to fifth segments anteriad to this ventral slit.

Reproduction prolific, larviparous. Development endoparasitic and highly hypermetamorphic. Hosts various, hexapodal. First larvæ, or triungulinids, campodeiform hexapods. Parasitic stages apodous. The male puparium, with cephalothorax protruded from the abdomen of the host, is merely the last larval skin with a cap-like lid, or cephalotheca. The pupa is similar to those of the Coleoptera and Hymenoptera and lies free in its case.

Habits and metamorphosis.—Probably no order of insects has as a whole a more wonderful or more interesting manner of life than the order which we are now studying. Only three orders of insects have been constructed to contain parasites only, viz.: Siphunculata, Siphonaptera and Strepsiptera, but parasitism has in the Strepsiptera reached a more complex development than is displayed elsewhere among insects.

The difference between the sexes is very striking. The male is an agile two-winged insect of very small size, almost constantly on the wing. The female is merely a white legless sack with the head and thorax flattened into a brown acariform disc. The abdomen remains permanently enclosed in the body of the host and only the cephalothorax protrudes. The female's abdomen is merely a great sack full of eggs, all of which develop at the same time, and not in ovaries, but free in the body cavity. The real female never sheds its last skin. It has lost all instinct, except that which causes it to force its chitinized cephalothorax out through the abdomen of its host.

The eggs mature within the body cavity and the young, which are numbered in the thousands, find exit from the body of the parent through genital canals opening outside of the body. They find themselves then in a larger passage formed between the venter of the female and its uncast pupal skin, in which they pass forward and find exit through a slit between the head and prothorax on the cephalothorax. The female reposes with its venter upward, so, when the young emerge, they crawl all over the body of the host. These young are very lively little hexapods, which we call triungulinids.

The triungulinid remains upon the body of the host until it gets a chance to slip off or is brushed off into a nest or flower. In the latter case it waits until another host comes along and takes passage with it, and is carried to a nest finally. When it reaches a nest it hunts around until it finds a larval host, into which it quickly burrows.

Inside its host parasitic life quickly causes it to lose its legs, and the eyes to disappear, and it is soon entirely grub-like; then the segments of the head and thorax fuse. The male and female, after the second molt, appear different, the female becoming as just described, while the male becomes cylindrical and in the later stages shows a patch of eyes, resembling the primitive collembolan eye patches, but more regular. The anterior portion hardens and is pushed outward, resembling a dipteran pupa case, with tuberculate head and a little cap at the tip of the cylinder. Within this skin a real pupa forms and finally the adult emerges by casting off the puparium-cap, or cephalotheca. The adult male is a most peculiar insect with one pair of large, milky-white wings, shaped as a quadrant of a circle; with a short transverse head; with large eyes composed of many separate facets divided by hairy partitions; with antennæ branched and covered with delicate sense organs; with rudimentary mouth parts, and with paddle shaped balancers on the mesothorax.

These insects fly like a flash, darting here and there, and with the balancers vibrating in unison with the wings and making quite a loud hum for such tiny creatures. Their sole purpose in life is to fertilize the females, which act is accomplished by setting loose the semina in the brood canal or cesophagus of the female.

Host list. — The following are the known habits of the species which have been studied :

Myrmecolax nietneri, Westwood, parasitizes an undetermined formicid; Ceylon.

Stylops advarians, Pierce, parasitizes *Andrena advarians*, Viereck; British Columbia.

Stylops andrenoides, Pierce, parasitizes *Andrena andrenoides*, Cresson; Illinois.

Stylops asteridis, Pierce, parasitizes *Andrena asteris*, Robertson; Illinois.

Stylops aterrima, Newport, parasitizes *Andrena trimmerana*, Kirby; England.

Stylops bipunctatae, Pierce, parasitizes *Andrena bipunctata*, Cresson; Nebraska, Wisconsin, Indiana, Alabama.

Stylops bruneri, Pierce, parasitizes *Andrena illinoiensis*, Robertson; Nebraska, Illinois.

Stylops californica, Pierce, parasitizes *Andrena subtilis*, Smith; Southern California.

Stylops childreni, Gray, parasitizes *Andrena victimae*, Smith; Nova Scotia.

Stylops claytoniae, Pierce, parasitizes *Andrena imitatrix*, Cresson; and its race *claytoniae*, Robertson; Georgia, Illinois, Texas.

Stylops claytoniae, var. *vierecki*, Pierce, parasitizes *Andrena imitatrix*, var. *profunda*, Viereck; Texas.

Stylops cornii, Pierce, parasitizes *Andrena commoda*, Smith; Wisconsin.

Stylops crawfordi, Pierce, parasitizes *Andrena crawfordi*, Viereck; Texas.

Stylops cressoni, Pierce, parasitizes *Andrena cressoni*, Robertson; Maine.

Stylops dalii, Curtis, parasitizes *Andrena labialis*, Kirby; England.

Stylops dominiquei, Pierce, parasitizes *Andrena flessae*, Panzer; France.

Stylops graenicheri, Pierce, parasitizes *Andrena nivalis*, Smith; Wisconsin.

Stylops hartfordensis, Pierce, parasitizes *Andrena nasoni hartfordensis*, Cockerell; Georgia.

Stylops hippotes, Pierce, parasitizes *Andrena hippotes*, Robertson; Ohio.

Stylops mandibularis, Pierce, parasitizes *Andrena mandibularis*, Robertson; Illinois.

Stylops melittae, Kirby, parasitizes *Andrena nigro-aenea*, Kirby; England, Germany, Hungary.

Stylops multiplicatae, Pierce, parasitizes *Andrena multiplicata*, Cockerell; Wisconsin.

Stylops nasoni, Pierce, parasitizes *Andrena nasoni*, Robertson; Pennsylvania.

Stylops nassonowi, Pierce, parasitizes *Andrena carbonaria*, Linnæus; Germany, Egypt.

Stylops nubeculae, Pierce, parasitizes *Andrena nubecula*, Smith; Colorado.

Stylops nudae, Pierce, parasitizes *Andrena nuda*, Robertson; Illinois.

Stylops oklahomae, Pierce, parasitizes *Andrena flavoclypeata miserabilis*, Cresson; Oklahoma.

Stylops packardi, Pierce, parasitizes *Andrena placida*, Smith; Massachusetts.

Stylops pilipedis, Pierce, parasitizes *Andrena pilipes*, Fabricius; China.

Stylops polemonii, Pierce, parasitizes *Andrena polemonii*, Robertson; Colorado.

Stylops salicifloris, Pierce, parasitizes *Andrena salicifloris*, Cockerell; Washington.

Stylops solidulae, Pierce, parasitizes *Andrena solidula*, Viereck; Washington.

Stylops sparsipilosae, Pierce, parasitizes *Andrena sparsipilosa*, Viereck; Maine.

Stylops spencii, Pickering, parasitizes *Andrena tibialis*, Kirby; England, Germany.

Stylops subcandidae, Pierce, parasitizes *Andrena subcandida*, Viereck; Southern California.

Stylops swenki, Pierce, parasitizes *Andrena solidaginis*, Robertson; Nebraska, Pennsylvania.

Stylops thwaitei, Saunders, parasitizes *Andrena afzeliella*, Kirby; England, France, Germany, Switzerland, Hungary.

Stylops ventricosae, Pierce, parasitizes *Andrena ventricosa*, Dours; Hungary.

Stylops vicinae, Pierce, parasitizes *Andrena vicina*, Smith; New Hampshire, Massachusetts, Connecticut, Canada.

Hylechthrus quercus, Saunders, parasitizes *Prosopis gibba*, Saunders; Epirus.

Hylechthrus rubi, Saunders, parasitizes *Prosopis rubicola*, Saunders; Epirus.

Hylechthrus sieboldii, Saunders, parasitizes *Prosopis variegata*, Fabricius; Epirus.

Halictoxenos crawfordi, Pierce, parasitizes *Halictus (Chloralictus) bruneri*, Crawford; Nebraska.

Halictoxenos graenicheri, Pierce, parasitizes *Halictus (Chloralictus) albipennis*, Robertson; Wisconsin.

Halictoxenos jonesi, Pierce, parasitizes *Halictus* sp.; Louisiana.

Halictoxenos nymphaeari, Pierce, parasitizes *Halictus (Chloralictus) nymphaearum*, Robertson; Illinois.

Halictoxenos sparsi, Pierce, parasitizes *Halictus (Chloralictus) sparsus*, Robertson; Oklahoma.

Halictoxenos versati, Pierce, parasitizes *Halictus (Chloralictus) versatus*, Robertson; Wisconsin.

Halictoxenos zephyri, Pierce, parasitizes *Halictus (Chloralictus) zephyrus*, Smith; Wisconsin.

Halictoxenos (Halictophilus) manilae, Pierce, parasitizes *Halictus (Evylaeus) manilae*, Ashmead; Philippines.

Halictoxenos (Halictophilus) robbii, Pierce, parasitizes *Halictus (Evylaeus) robbii*, Ashmead; Philippines.

Halictoxenos (Augochlorophilus) viridulae, Pierce, parasitizes *Augochlora viridula*, F. Smith; Illinois.

Halictoxenos (Halictostylops) spencii, Nassonow, parasitizes *Halictus minutus*, Kirby; England, Europe.

Crawfordia cockerelli, Pierce, parasitizes *Panurginus boylei*, Cockerell; New Mexico.

Crawfordia labrosi, Pierce, parasitizes *Pseudopanurgus labrosus*, Robertson; Illinois.

Crawfordia fulvinipes, Pierce, parasitizes *Panurginus* sp.; Nebraska.

Crawfordia rudbeckiae, Pierce, parasitizes *Pseudopanurgus rudbeckiae*, Robertson; Illinois.

Xenos auriferi, Pierce, parasitizes *Polistes aurifer*, Saussure; California.

Xenos bowditchi, Pierce, parasitizes *Polistes pallipes*, Lepeletier; Massachusetts, Ohio.

Xenos bruesi, Pierce, parasitizes *Polistes metricus*, Say; Michigan.

Xenos hubbardi, Pierce, parasitizes *Polistes crinitus*, Felton; Florida.

Xenos hunteri, Pierce, parasitizes *Polistes* n. sp. near *minor*; Texas.

Xenos jurinei, Saunders, parasitizes *Polistes gallicus*, Linnæus; Switzerland.

Xenos maximus, Pierce, parasitizes *Polistes rubiginosus*, Lepeletier; Texas.

Xenos nigrescens, Brues, parasitizes *Polistes rubiginosus*, Lepeletier; Texas, Louisiana.

Xenos pallidus, Brues, parasitizes *Polistes annularis*, Linnæus; Texas, Florida, District of Columbia.

Xenos peckii, Kirby, parasitizes *Polistes fuscatus*, Fabricius; Massachusetts.

Xenos pecosensis, Pierce, parasitizes *Polistes texanus*, Cresson, and *Polistes rubiginosus*, Lepeletier; Texas.

Xenos rubiginosi, Pierce, parasitizes *Polistes rubiginosus*, Lepeletier; Louisiana.

Xenos texani, Pierce, parasitizes *Polistes texanus*, Cresson; Texas.

Xenos wheeleri, Pierce, parasitizes *Polistes metricus*, Say; Connecticut, District of Columbia, New York.

Xenos vesparum, Rossi, parasitizes *Polistes gallicus*, Linnæus; Europe.

Vespaexenos buyssoni, Pierce, parasitizes *Vespa ducalis*, Smith; Annam.

Vespaexenos crabronis, Pierce, parasitizes *Vespa crabro*, Linnæus; Japan.

Vespaexenos moutoni, Buysson, parasitizes *Vespa mandarina*, Smith, *V. magnifica*, Smith, and *V. nigra*,
Buysson; China

Belonogastechthrus zavattarii, Pierce, parasitizes *Belonogaster elegans*, Gerstäcker; Congo Free State.

Pseudoxenos arvensidis, Pierce, parasitizes *Odynerus arvensis*, Saussure; Illinois.

Pseudoxenos corcyricus, Saunders, parasitizes *Odynerus spinipes*, Linnæus; Corcyra.

Pseudoxenos erynnidis, Pierce, parasitizes *Odynerus erynnys*, Lepeletier; Florida.

Pseudoxenos foraminati, Pierce, parasitizes *Odynerus foraminatus*, Saussure; Illinois.

Pseudoxenos fundati, Pierce, parasitizes *Odynerus fundatus*, Cresson; Illinois.

Pseudoxenos heydenii, Saunders, parasitizes *Odynerus deflendus*, Saunders; Epirus, Corcyra.

Pseudoxenos histrionis, Pierce, parasitizes *Odynerus histrio*, Lepeletier; Florida.

Pseudoxenos hookeri, Pierce, parasitizes *Odynerus verus*, Cresson; Texas.

Pseudoxenos jonesi, Pierce, parasitizes *Odynerus colon*, Cresson; Louisiana.

Pseudoxenos klugii, Saunders, parasitizes *Odynerus laevipes*, Shuckard; Epirus.

Pseudoxenos louisianae, Pierce, parasitizes *Odynerus vagans*, Saussure; Louisiana.

Pseudoxenos pedestridis, Pierce, parasitizes *Odynerus pedestris*, Saussure; Illinois.

Pseudoxenos robertsoni, Pierce, parasitizes *Odynerus histrionalis*, Robertson; Illinois.

Pseudoxenos schaumii, Saunders, parasitizes *Odynerus parietum*, Linnæus; Coreyra.

Pseudoxenos tigridis, Pierce, parasitizes *Odynerus tigris*, Saussure; Illinois.

Monobiaphila bishoppi, Pierce, parasitizes *Monobia quadridens*, Linnæus; Texas.

Tachytixenos indicus, Pierce, parasitizes *Tachytes xenoferus*, Rohwer; India.

Sceliphronechthrus fasciati, Pierce, parasitizes *Sceliphron fasciatum*, Lepeletier; Santo Domingo.

Eupathocera luctuosa, Pierce, parasitizes *Sphex luctuosa*, F. Smith; Idaho, Colorado.

Eupathocera lugubris, Pierce, parasitizes *Sphex fragilis*, Smith; Ohio.

Eupathocera pictipennidis, Pierce, parasitizes *Sphex pictipennis*, Walsh; Illinois.

Eupathocera pruinosa, Pierce, parasitizes *Sphex pruinosa*, Cresson; Colorado.

Eupathocera sieboldii, Saunders, parasitizes *Miscus campestris*, Latreille, Germany.

Eupathocera sphecidarum, Dufour, parasitizes *Sphex sabulosa*, Linnæus; France, Germany.

Eupathocera vulgaridis, Pierce, parasitizes *Sphex vulgaris*, Cresson; Illinois.

Ophthalmochlus abbotti, Pierce, parasitizes *Chlorion* sp.; Siam.

Ophthalmochlus ashmeadi, Pierce, parasitizes *Chlorion fernanum*, Kohl; Santo Domingo.

Ophthalmochlus auripedis, Pierce, parasitizes *Chlorion auripes*, Fernald; Pennsylvania.

Ophthalmochlus bishoppi, Pierce, parasitizes *Chlorion ichneumoneum*, Linnæus; Texas.

Ophthalmochlus duryi, Pierce, parasitizes *Chlorion atrata*, Lepeletier; Ohio.

Ophthalmochlus westwoodi, Templeton, parasitizes *Chlorion ichneumoneum auriflum*, Perty; Brazil.

Paraxenos erberi, Saunders, parasitizes *Bembecinus peregrinus*, Smith; Coreyra.

Stichotrema dallatorreanum, Hofeneder, parasitizes *Sexara nubila*, Stål; Admiralty Islands.

Pentacladocera schwarsii, Perkins, parasitizes *Agallia* sp.; New South Wales.

Agalliaphagus americanus, Perkins, parasitizes *Agallia quadrinotata*; Ohio.

Pentozocera australensis, Perkins, parasitizes *Tetigonia parthaon*, Kirkaldy; Queensland.

Pentozocera phaeodes, Perkins, parasitizes *Hecalus immaculatus*, Kirkaldy; Queensland.

Pentozocera stenodes, Perkins, parasitizes *Paradyridium menalus*, Kirkaldy; Queensland.

Pentozocera schwarsi, Pierce, parasitizes *Dicdrocephala sanguinolenta*, Coquiábar; Guatemala.

Pentozoe peradeniya, Pierce, parasitizes *Thompsoniella arcuata*, Motschulsky; Ceylon.

Megalechthrus tryoni, Perkins, parasitizes *Platybrachus* sp.; Queensland.

Neocholax jacobsoni, Meijere, parasitizes a fulgorid; Java.

Diozocera insularum, Pierce, parasitizes *Xerophloea viridis*, Fabricius; Grenada, St. Vincent.

Deinelenchus australensis, Perkins, parasitizes *Platybrachys* sp.; Queensland.

Elenchus melania, Perkins, and its variety *silvestris*, Perkins, parasitizes *Delphacidae*; Hawaii.

Elenchus tenuicornis, Kirby, parasitizes *Liburnia* sp.; England.

Mecynocera koebelei, Pierce, parasitizes *Liburnia campestris*, Van Duzee, and *L. lutulenta*, Van Duzee; Ohio.

Elenchoides perkinsi, Pierce, parasitizes *Perkinsiella vitiensis*, Kirkaldy; Fiji.

Pentagrammaphila uhleri, Pierce, parasitizes *Pentagramma vittatifrons*, Uhler; Dacota.

Colacina insidiator, Westwood, parasitizes *Epora subtilis*, Walker; Borneo.

Geographical distribution. — The Orthoptera, Heteroptera, Homoptera and Hymenoptera are at present the only orders known to be parasitized. The parasites are found in all the great realms of the world. Eighty-one species are known from the Nearctic Realm of Wallace, seven from the Neotropical, twenty-eight from the Palearctic, two from the Ethiopian, eleven from the Oriental, and ten from the Australian Realms; only one species occurring in two realms. (See p. 48.)

TABLE OF SUPERFAMILIES

1a. *Male tarsi with five joints and two tarsal claws.* . . . 1. Superfam. MENGEOIDEA, Pierce p. 8
 1b. *Male tarsi with less than five joints.*

2a. *Female spiracles more or less easily discernible,
generally prominent.*

3a. *Female with four or five genital tubes entering
brood-canal; male tarsi with four joints* . . . 2. Superfam. XENOIDEA, Pierce p. 12
 3b. *Female with three rows of twelve or more
genital tubes entering brood-canal; male
unknown* 3. Superfam. STICHOTREMATOIDEA, Hofeneder, p. 32

2b. *Female spiracles not usually discernible, never
prominent.*

4a. *Male tarsi with three joints; female
head with apical tubercles* 4. Superfam. HALICTOPHAGOIDEA, Pierce . . p. 33
 4b. *Male tarsi with two joints; female
head with tubercles ventral, more or
less obsolete; only three genital tubes
entering brood-canal* 5. Superfam. ELENCHOIDEA, Pierce. . . . p. 42

SUPERFAM. MENGEOIDEA

Mengeoidea. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 76 (1908); Bull. U. S. Nat. Mus. no. 66, p. 84 (1909).

Characters. — *Male.* — Tarsi five-jointed, and with two tarsal claws.

Female unknown.

This superfamily has been divided into two families.

TABLE OF FAMILIES

1a. Antennae seven-jointed, third and fourth joints laterally produced	1. Fam. MENGEIDÆ, Pierce.
1b. Antennae six-jointed, third, fourth and fifth joints laterally produced, sixth elongate	2. Fam. MENGENILLIDÆ, Hofeneder.

FAM. MENGEIDÆ

Mengeidæ. Pierce, Proc. Ent. Soc. Wash. Vol. 9, pp. 76, 77 (1908); Bull. U. S. Nat. Mus. no. 66, p. 84 (1909).

Characters. — *Male.* — Antennæ seven-jointed, third and fourth joints laterally produced.

Female unknown.

The family contains two genera.

TABLE OF GENERA

1a. Wings having eight primary veins from base, with one distal detached vein between subcosta and radius and with the first and second anal apically united	1. Genus MENGEA, Grote.
1b. Wings having seven primary veins from base, with one distal detached vein beyond the tip of the radius, another above the radius, medius with two superior branches, third anal lacking	2. Genus TRIOZOCERA, Pierce.

I. GENUS MENGEA, GROTE

Triæna. Menge, Schrift. Naturf. Ges. Danzig (2), Vol. 1; pp. 3, 4 (1866) (preoccupied).

Mengea. Grote, The Canad. Entom. Vol. 17, p. 100 (1886).

Characters. — *Male.* — Head transverse, eyes multiple-facetted, normal. Mandibles short, acute; maxillæ with basal joint short, palpus longer. Antennæ pubescent, sensitive, seven-jointed; first two joints short; third and fourth laterally flabellate; fifth, sixth and seventh cylindrical. Prothorax transverse, broadest at base; mesothorax somewhat broader and longer, with a sharply outlined scutellum; metathorax long. Elytra short. Wings having eight primary veins from base, with one distal detached vein between the subcosta and radius, and with the first and second anal veins apically united. Tarsi five-jointed, the last joint bearing two three-angled, straight claws.

Female unknown.

Type of genus. — *M. tertaria*, Menge.

Geographical distribution of species. — Hosts unknown.

1. *M. tertaria*, Menge. — Pl. 5, Figs. 1, 2. Fossil in amber, Germany.
Triaena tertaria, Menge, Schrift. Naturf. Ges. Danzig (2), Vol. 1, pp. 3, 4, ff. 1-6 (1866).
Mengea tertaria, Grote, The Canad. Entom. Vol. 17, p. 100 (1886); Pierce, Bull. U. S. Nat. Mus. no. 66, p. 84, pl. 1, f. 1 (1909); Hofeneder, Bericht. Naturw. Med. Ver. Innsbruck, Vol. 31, pp. 33-57, ff. 10-15 (1910).
Irishmizels Morph. Oekol. Tiere, §. 17, 45-62 figs. 192

2. GENUS TRIOZOCERA, PIERCE

Trioxocera. Pierce, Bull. U. S. Nat. Mus. no. 66, p. 86 (1909) (typographical error).

Triozocera. Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 490 (1911) (application made to International Commission of Nomenclature for authority to emend).

Characters. — *Male.* — Head transverse, emarginate behind; eyes multiple-facetted, the partitions very pubescent. Antennæ pubescent, sensitive, seven-jointed; first two joints short, cylindrical; third and fourth laterally flabellate; fifth, sixth and seventh cylindrical. Prothorax and mesothorax transverse. Elytra clavate. Metathoracic præscutum transverse, very little longer on median line than at sides; scuti broad, but not longer than scutellum; scutellum elongate conical, anteriorly rounded at apex; postlumbium very short and transverse and of a slightly different consistency; postscutellum broadly rounded at apex, as long as the preceding portions of the metathorax. Wings having seven primary veins from base, with one distal detached vein beyond tip of radius, one or two detached veins in front of medius; third anal lacking or indicated by an infuscation. Coxæ contiguous; anterior and median trochanters distant. Tarsi five-jointed, first three joints elongate, without pulvilli, the first much longer than the others, fourth with pulvillus, fifth slender and delicate, bearing two long slender claws. Tenth dorsal segment consisting of a very small rounded flap, bearing the anus. Oedeagus long and slender, gently sinuate, acute at tip, but not abruptly angulate near tip.

Female unknown.

Type of genus. — *T. mexicana*, Pierce.

Geographical distribution of species. — Hosts unknown.

1. *T. mexicana*, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 86, 87, text fig. 3, Mexico.
nos. 1, 2; pl. 1, ff. 2, 3, 4 (1909). — Pl. 1, Fig. 1; Pl. 4, Figs. 16, 31, 40.
2. *T. texana*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 491 (1911). Texas.

FAM. MENGENILLIDÆ

Mengenillidæ. Hofeneder, Ber. Naturw. Med. Ver. Innsbruck, Vol. 31, pp. 33-35 (1910).

Characters. — *Male.* — Antennæ six-jointed, with the third, fourth and fifth joints laterally produced and the sixth elongate; tarsi five-jointed.

Female unknown.

The family contains two genera.

TABLE OF GENERA

1a. Prothorax narrow transverse; wings with six primary veins, and with faint traces of two detached veins between radius and medius; mandibles elongate, acute	1. Genus MENGENILLA, Hofeneder.
1b. Prothorax anteriorly causing an emargination of the head; wings (apparently) with seven primary veins, with detached vein behind the radius and one behind the medius, third anal lacking; mandibles triangular	2. Genus AUSTROSTYLOPS, Lea.

I. GENUS MENGENILLA, HOFENEDER

Mengenilla. Hofeneder, Ber. Naturw. Med. Ver. Innsbruck, Vol. 31, pp. 34-44 (1910).

Characters — *Male.* — Head transverse; eyes large, prominent, many faceted. Mandibles elongate, acute; maxillæ two-jointed, elongate. Antennæ six-jointed, sensitive, with the third, fourth and fifth joints laterally produced and the sixth elongate. Prothorax and mesothorax transverse. Metathorax elongate, with præscutum more or less quadrate, causing an emargination of the mesothorax; scuti about twice as long as wide; scutellum ogival, elongate; postlumbium almost as long on median line as it is wide at base; postscutellum broad, hardly more than twice as long as wide, rounded at apex, deeply emarginate at base by postlumbium. Wings with six primary veins, and with faint traces of two detached veins between radius and medius. Tarsi five-jointed, armed with two claws. Oedeagus at base large, but rapidly diminishing to a point, gently sinuate, not angulate near apex.

Female unknown.

Type of genus. — *M. chobautii*, Hofeneder.

Geographical distribution of species. — Hosts unknown.

1. *M. chobautii*, Hofeneder, Ber. Naturw. Med. Ver. Innsbruck, Vol. 31, Algeria.
pp. 34-44, ff. 1-9 (1910). — Pl. 4, Figs. 17, 32.

2. GENUS AUSTROSTYLOPS, LEA

Austrostylops. Lea, Trans. Ent. Soc. Lond. Pt. 4, pp. 514-516, pl. 66 (1910).

Characters. — *Male.* — Head strongly transverse, emarginate by prothorax; eyes large, occupying about two-thirds of the width of the head, coarsely faceted. Oral cavity irregularly rounded;

mandibles triangular, wide at base, pointed at tip and not touching each other; maxillæ narrow, less triangular, apically obtuse, not meeting each other. Antennæ six-jointed, with the third, fourth and fifth joints laterally produced and the sixth elongate, not much shorter than the produced portions of the preceding joints. Mesothorax very narrow in the middle, but with the sides suddenly dilated; elytra about once and one-fourth as long as the width of the metathorax. Metathorax elongate, with the præscutum quadrate; scuti elongate, widest behind the præscutum; scutellum elongate, anteriorly rounded and rather broadly separating the scuti, thence obliquely enlarging to base of postscutellum, posteriorly deeply rounding, emarginate by the postlumbium; postlumbium membranous, concave, as long as wide, more narrowly rounded behind; postscutellum deeply emarginate by postlumbium, convex and apically rounded. Wings large,

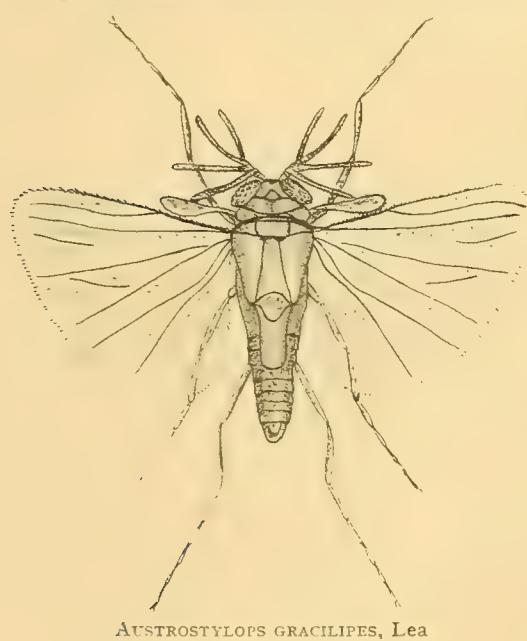
apparently seven-veined (to judge from Lea's figure); costa and subcosta united only to about basal third, from which point the subcosta appears as a strong branch; radius complete; a small detached apical vein lies midway between radius and medius; medius (apparently) detached at base; a small detached branch behind this takes a very peculiar direction (according to the figure); cubitus and two anal veins complete, third anal lacking. Legs long and thin. Front coxæ, femora and tibiæ of about equal lengths, but the coxæ slightly stouter than the femora, and these than the tibiæ; trochanters about one-third the length of the femora, to which they are closely applied; first joint of tarsi about once and one-half the length of second, and about the width of the tibiæ, second joint much thinner, third, fourth and fifth slightly decreasing in length. Middle legs apparently much as front ones. Hind coxæ obliquely placed, about four times as wide as long, touching in middle; femora, tibiæ and tarsi rather longer than in front legs, but otherwise much the same. Last tarsal joint armed with two thin equal claws.

Female unknown.

Type of genus. — *A. gracilipes*, Lea.

Geographical distribution of species. — Hosts unknown.

1. *A. gracilipes*, Lea, Trans. Ent. Soc. Lond. Pt. 4, pp. 515, 516, pl. 66 West Australia.
(December 21, 1910).



AUSTROSTYLOPS GRACILIPES, Lea

SUPERFAM. XENOIDEA

Stylopinæ. Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Assoc. Bull. 1, Pt. 3, Honolulu (1905).

Xenoidea. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 76 (1908); Bull. U. S. Nat. Mus. no. 66, p. 87 (1909).

Characters. — *Male.* — Tarsi four-jointed.

Female having cephalothoracic spiracles more or less easily discernible, generally prominent; four or five genital tubes entering brood-canal.

This superfamily has been divided into four families, all parasites of Hymenoptera.

TABLE OF FAMILIES

1a. <i>Male antennae seven-jointed, third joint laterally produced, fourth joint short, fifth to seventh joints elongate. Female unknown . . .</i>	1. Fam. MYRMECOLACIDÆ, Pierce.
1b. <i>Male antennae six-jointed, the third joint laterally produced, fourth to sixth joints together not surpassing flabellum of third. Female cephalothorax broadly truncate or rounded at apex; head about one-half as wide as metathorax at spiracles; five genital tubes entering brood-canal</i>	2. Fam. STYLOPIDÆ, Kirby.
1c. <i>Male antennae five-jointed, the third joint laterally produced, fourth joint very short, fifth elongate. Female cephalothorax with head not more than one-half as wide as metathorax at spiracles . . .</i>	3. Fam. HYLECHTHRIDÆ, Pierce.
1d. <i>Male antennae four-jointed, the third joint laterally produced, fourth joint elongate. Female cephalothorax variable in shape; four or five genital tubes entering brood-canal</i>	4. Fam. XENIDÆ, Semenov.

FAM. MYRMECOLACIDÆ

Myrmecolacides. Saunders, Trans. Ent. Soc. Lond. p. 34 (1872).

Myrmecolacidæ. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 76 (1908); Bull. U. S. Nat. Mus. no. 66, p. 87 (1909).

Characters. — *Male.* — Antennæ seven-jointed, third joint laterally produced, fourth joint short, fifth to seventh elongate; tarsi four-jointed.

Female unknown.

TABLE OF GENERA

1a. Wings short in proportion to body, with eight primary veins. Fifth and sixth antennal joints subclavate 1. Genus MYRMECOLAX, Westwood.

1b. Wings long, with only six primary veins from base, the cubitus and third anal being missing, with a short detached vein just below the apex of the radius, medius short and continued by a long detached vein beginning behind it and shortly before its apex. Fifth and sixth antennal joints slender throughout 2. Genus CÆNOCHOLAX, Pierce.

I. GENUS MYRMECOLAX, WESTWOOD

Myrmecolax. Westwood, Trans. Ent. Soc. Lond. (2), Vol. 5, pp. 418-420, plate (1861).

Characters. — *Male.* — Head transverse, emarginate posteriorly; eyes multiple-faceted with the interspaces conically elevated. Frontal process prominent. Oral cavity subtriangular. Mandibles long, slender, curved and apically acute; maxillæ two-jointed, the basal joint short, the palpus long. Antennæ minutely pubescent, sensitive, seven-jointed, with the first two joints short, third laterally produced into an elongate flabellum; fourth very small and cylindrical; fifth, sixth and seventh joints elongate, together longer than the flabellum of the third; the fifth and sixth joints subclavate. Prothorax arched forward, longer than mesothorax. Elytra a little longer than the width of the mesothorax, clavate. Metathorax with præscutum keystone-shape; scuti broad and rather widely separated; scutellum triangular, rounded at apex; postlumbium of different consistency from the other parts, semi-elliptical; postscutellum broad and rather short. Wings having eight primary veins from base. Legs very small; coxæ contiguous; anterior and median trochanters inflated, distant, posterior approximate; posterior femora inflated; tarsi four-jointed, the first largest, all with pulvilli, claws lacking. Ædeagus slender, but slightly arcuate, very strongly and acutely reflexed near apex; apex acute.

Female unknown.

Type of genus. — *M. nietneri*, Westwood.

Geographical distribution of species. — Parasites of Formicidæ.

1. *M. nietneri*, Westwood, Trans. Ent. Soc. Lond. (2), Vol. 5, pp. 418-420, Ceylon.
plate (1861). — Pl. I, Fig. 2; Pl. 4, Fig. 18.

M. nietneri, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 88, pl. I, ff. 5, 6
(1909); Proc. U. S. Nat. Mus., Vol. 40, p. 492 (1911).

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2. GENUS CÆNOCHOLAX, PIERCE

Cænocholax. Pierce, Bull. U. S. Nat. Mus. no. 66, p. 88 (1909).

Characters. — *Male.* — Head transverse, considerably wider than thorax; eyes multiple-faceted, large. Oral cavity broadly rounded. Mandibles elongate, slender, acute. Maxillæ with basal joint globular, fleshy, sensitive; palpus arising from outer side, long and slender. Antennæ seven-jointed, sensitive; the first two joints transverse, cylindrical, cupped; third short, laterally produced into a long flabellum; fourth very short; fifth, sixth and seventh elongate, slender. Prothorax and mesothorax transverse. Elytra elongate, clavate. Metathorax very long; præscutum elongate, broadly ogival; scuti

reaching base of mesothorax at sides, united behind præscutum; scutellum short, triangular, with rounded basal angles, not as long as præscutum; postlumbium transverse, indistinct; postscutellum broadly rounded. Wings with six primary veins, with a short detached vein just below the apex of the radius, with the medius short and continued by a long detached vein commencing behind it and shortly before its apex, cubitus and third anal lacking. Coxæ contiguous; anterior and median trochanters distant; tarsi four-jointed, without claws. Tenth dorsal segment appearing as a very broad, transverse oboval flap covering the genital apparatus, and bearing the anus between two folds. Oedeagus arcuate, apically suddenly and acutely reflexed, apex acute.

Female unknown.

Type of genus. — *C. fenyesi*, Pierce.

Geographical distribution of species. — Hosts unknown.

1. *C. fenyesi*, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 89, 90, text fig. 3, Mexico.
nos. 3, 4, pl. 1, ff. 7-11 (1909). — Pl. I, Fig. 4; Pl. 4, Figs. 19, 33.

FAM. STYLOPIDÆ

Stylopidae. Kirby, Trans. Linn. Soc. Lond. Vol. 11, p. 102 (1813).

Stylopides. Saunders, Trans. Ent. Soc. Lond. p. 21 (1872).

Stylopidae. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 76 (1908); Bull. U. S. Nat. Mus. no. 66, p. 90 (1909).

Characters. — *Male.* — Antennæ six-jointed, third joint laterally produced; tarsi four-jointed.

Female. — Cephalothorax broadly truncate or rounded at apex; head about one-half as wide as metathorax at spiracles; five genital tubes entering brood-canal.

The family includes two genera, parasites of Andrenidæ.

TABLE OF GENERA

ia. Wings with eight primary veins from base, with two distal detached veins between the radius and medius; antennæ short and robust. Female cephalothorax broadly truncate or rounded at apex; head about one-half as wide as metathorax at spiracles	1. Genus STYLOPS, Kirby.
ib. Wings with seven primary veins from base, cubitus missing, costal margin with distinct stigma, subcosta and radius apically united, a detached branch of medius immediately posterior to that vein, a detached branch of medius between radius and medius, third anal very short; antennæ more attenuate. Female unknown	2. Genus PARASTYLOPS, Meijere.

I. GENUS STYLOPS, KIRBY

Stylops. Kirby, Monogr. Apum Angliæ. Vol. 2, pp. 112, 113 (1802); Trans. Linn. Soc. Lond. Vol. 11, pp. 112, 113 (1813); Curtis, Brit. Ent. Vol. 5, p. 226 (1828); Saunders, Trans. Ent. Soc. Lond. p. 26 (1872); Pierce, Bull. U. S. Nat. Mus. no. 66, p. 90 (1909).

Characters. — *Male.* — Head transverse, eyes prominent, multiple-facetted. Mandibles long, slender, lanceolate; maxillæ two jointed. Antennæ sensitive, short and robust, six-jointed; third joint laterally produced, following joints cylindrical. Prothorax and mesothorax transverse, band-like. Elytra short, crumpled. Metathorax elongate; præscutum transverse, laterally convex, apically truncate, about twice as wide as long; scuti reaching base of metathorax at sides of præscutum, and united behind latter; scutellum bluntly triangular with convex sides, longer than præscutum, but separated from it by the scutum; postlumbium semi-circular in outline and of a different consistency from the other parts; postscutellum very broad and apically broadly rounded, not twice as long as wide. Wings with eight

primary veins from base, with two detached veins between radius and medius. Coxæ contiguous; middle trochanters approximate; tarsi four-jointed, without claws. Gedeagus at base triangularly truncate externally, at basal third with a long shallow emargination on external edge, at apical third abruptly bent outward in a rounded right angle, tapering to a point, the inner edge at apical bend is produced also in an acute process, the two apices being united by a convex edge.

Female. — Cephalothorax rather abruptly narrowed behind stigmatal angle, subtriangular to ovate, more or less obtuse or truncate at apex. Head about half as wide as metathorax at spiracles. Spiracles often prominent. Mouth ventral, with mandibles on each side, rather broad and obtuse. Abdomen with five median genital canals on the second to sixth segments.

Triungulinid. — Body oblong, slightly narrowing posteriad. Tenth segment medianly cleft, forming two tubercles, each bearing a long stylet.

Type of species. — *S. melittae*, Kirby.

Geographical distribution of species. — Parasites of bees of the genus *Andrena*.

1. *S. advarians*, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 97, 98, pl. 3, British Columbia.
f. 1 (1909).
2. *S. andrenoides*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, pp. 493, 494 (1911). Illinois.
3. *S. asteridis*, Pierce, ibidem, p. 494 (1911). Illinois.
4. *S. aterrima*, Newport, Proc. Linn. Soc. Lond. Vol. 1, pp. 317-320 (1847). England.
S. trimmerana, Smith, Trans. Ent. Soc. Lond. (2), Vol. 4, pp. 115-118,
pl. 24, ff. B, C (1857).
S. aterrima, Saunders, Trans. Ent. Soc. Lond. p. 29 (1872).
S. melittae aterrima, Friese, Zool. Anzeig. Vol. 29, p. 739 (1906).
S. aterrima, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 97 (1909). Indiana, Alabama, Wisconsin,
Nebraska. [sin, Nebraska. Southern California.
5. *S. bipunctatae*, Pierce, ibidem, p. 98 (1909). Nova Scotia.
6. *S. bruneri*, Pierce, ibidem, p. 98, pl. 3, f. 2 (1909).
S. californica, Pierce, ibidem, p. 99 (1909).
S. childreni, Gray, in Griffith, Anim. Kingdom, Ins. Vol. 2, p. 683,
pl. 59 (1832).
S. childreni, Smith, Trans. Ent. Soc. Lond. (2), Vol. 4, pl. 24 (1857);
Pierce, Bull. U. S. Nat. Mus. no. 66, p. 96 (1909).
S. claytoniae, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 99, pl. 3, f. 3 (1909). Georgia.
S. imitatrix, Pierce, ibidem, p. 104, pl. 3, f. 10 (1909). Texas.
var. vierecki, Pierce, ibidem, p. 110, pl. 4, f. 11 (1909). Texas.
10. *S. cornii*, Pierce, ibidem, p. 100, pl. 3, f. 4 (1909). Wisconsin.
11. *S. crawfordi*, Pierce, ibidem, pp. 100-102, text fig. 3, nos. 5, 6; pl. 2,
ff. 5, 6, 8-12; pl. 3, f. 5 (1909). — **Pl. I, Fig. 5; Pl. 4, Figs. 20, 35.** Texas.
12. *S. cressoni*, Pierce, ibidem, p. 102, pl. 3, f. 6 (1909). Maine.
13. *S. dalii*, Curtis, Brit. Ent. Vol. 5, p. 226 (1828).
S. dalii, Smith, Trans. Ent. Soc. Lond. (2), Vol. 4, pl. 24 (1857).
S. melittae dahlii, Friese, Zool. Anzeig. Vol. 29, p. 739 (1906).
S. dalii, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 95 (1909). England.
14. *S. dominiquei*, Pierce, ibidem, pp. 102, 103 (1909). France.
15. *S. graenicheri*, Pierce, ibidem, p. 103, pl. 3, f. 7 (1909). Wisconsin.
16. *S. hartfordensis*, Pierce, ibidem, p. 103, pl. 3, f. 8 (1909). Georgia.
17. *S. hippotes*, Pierce, ibidem, pp. 103, 104, pl. 3, f. 9 (1909). Ohio.
18. *S. mandibularis*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, pp. 494, 495
(1911). Illinois.
19. *S. melittae*, Kirby, Monogr. Apum Angliæ, Vol. 2, pp. 112, 113 (1802). England, Germany, Hungary.
S. kirbyi, Leach, Zool. Misc. Vol. 3, p. 135 (1817).
S. haworthi, Stephens, Syst. Cat. Brit. Ins. Vol. 1, p. 403 (1829).
S. melittae, Saunders, Trans. Ent. Soc. Lond. pp. 26, 27 (1872); Pierce,
Bull. U. S. Nat. Mus. no. 66, pp. 94, 95, text fig. 2, no. 14: pl. 2, f. 4
(1909).

20. *S. multiplicatae*, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 104, pl. 3, Wisconsin.
f. 11 (1909).

21. *S. nasoni*, Pierce, ibidem, pp. 104, 105, pl. 4, f. 1 (1909). Pennsylvania.

22. *S. nassonowi*, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 105 (1909). Germany, Egypt.

23. *S. nubeculae*, Pierce, ibidem, p. 105; pl. 4, f. 2 (1909). Colorado.

24. *S. nudae*, Pierce, Proc. U. S. Nat. Mus., Vol. 40, p. 495 (1911). Illinois.

24. *S. oklahomae*, Pierce, Bull. U. S. Nat. Mus. no. 66 pp. 110, 111,
pl. 4, f. 3 (1909). Oklahoma.

26. *S. packardi*, Pierce, ibidem, pp. 105, 106 (1909). Massachusetts.

27. *S. pilipedis*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 495 (1911). China.

28. *S. polemonii*, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 106, pl. 4, f. 4 (1909). Colorado.

29. *S. salicifloris*, Pierce, ibidem, p. 106, pl. 4, f. 5 (1909). Washington.

30. *S. solidulae*, Pierce, ibidem, pp. 107, 108, pl. 2, ff. 7, 13; pl. 4, f. 6 (1909). Washington.

31. *S. sparsipilosae*, Pierce, ibidem, p. 108, pl. 4, f. 7 (1909). Maine.

32. *S. spencii*, Pickering, Trans. Ent. Soc. Lond. Vol. 1, p. 68, pl. 17 (1835). England, Germany.

S. spencii, Smith, Trans. Ent. Soc. Lond. (2), Vol. 4, pl. 24 (1857).
S. melittae spencii, Friese, Zool. Anzeig. Vol. 29, p. 739 (1906).
S. spencii, Pierce, Bull. U. S. Nat. Mus. no 66, p. 96 (1909).

33. *S. subcandidae*, Pierce, ibidem, p. 108, pl. 4, f. 8 (1909). Southern California.

34. *S. swenki*, Pierce, ibidem, p. 108, pl. 4, f. 9 (1909). Nebraska, Pennsylvania.

35. *S. thwaitei*, Saunders, Trans. Ent. Soc. Lond. p. 23 (1872). England.

S. thwaitei, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 97 (1909). Hungary.

36. *S. ventricosae*, Pierce, ibidem, pp. 109, 110 (1909). New Hampshire, Canada.

37. *S. vicinae*, Pierce, ibidem, p. 110, pl. 4, f. 10 (1909).

2. GENUS PARASTYLOPS, MEIJERE.

Parastylops. Meijere, Tijdschr. v. Ent. Vol. 51, pp. 188, 189 (1908); Pierce, Bull. U. S. Nat. Mus. no. 66, p. 111 (1909).

Characters. — *Male*. — Head transverse; eyes normal, faceted. Mandibles long and slender, outwardly arcuate; maxillæ long, two-jointed. Antennæ long, six-jointed, the first three joints short, the third laterally produced into a very long cylindrical process; the last three flattened, and together as long as the process of the third joint. Prothorax and mesothorax transverse. Metathorax elongate; præscutum elongate, keystone-shape, rounded truncate at apex; scuti not connected; scutellum broadly rounded at apex, shorter than præscutum; postlumbium transverse, apically convex; postscutellum very long, apically convex. Wings with seven principal veins, the subcostal and radial veins united at their apices; two free veins between radius and medius; stigma distinct. Tarsi four-jointed, without claws. Oedeagus near apex bent back into an acute process.

Female unknown.

Type of genus. — *P. flagellatus*, Meijere.

Geographical distribution of species. — Hosts unknown.

1. *P. flagellatus*, Meijere, Tijdschr. v. Ent. Vol. 51, p. 189, pl. 6, ff. 8-10 Java.
(1908). — Pl. 5, Figs. 16-18.

P. flagellatus, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 111, 112, pl. 2,
f. 1-3 (1909).

FAM. HYLECHTHRIDÆ

Hylechthridæ. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 76 (1908); Bull. U. S. Nat. Mus. no. 66, p. 113 (1909).

Characters. — *Male.* — Antennæ five-jointed, the third laterally produced, the fourth very short, and the fifth elongate; tarsi four-jointed.

Female. — Cephalothorax with head not more than one-half as wide as metathorax at spiracles.

The family includes only one genus.

I. GENUS HYLECHTHRUS, SAUNDERS

Hylechthrus. Saunders, Trans. Ent. Soc. Lond. (2), Vol. 1, p. 57 (1850); Pierce, Bull. U. S. Nat. Mus. no. 66, p. 113 (1909).

Characters. — *Male.* — Head large, transverse; eyes large, multiple-faceted. Mandibles rather short; maxillæ two-jointed. Antennæ five-jointed, the third laterally produced, the fourth very short, the fifth elongate. Wings with seven primary veins from base, with two distal detached veins between the radius and medius, which are basally united, and with the cubitus appearing as a detached vein (?). Tarsi four-jointed.

Female. — Cephalothorax with head not more than one-half as wide as metathorax at spiracles.

Type of genus. — *H. rubi*, Saunders.

Geographical distribution of species. — Parasites of bees of the genus *Prosopis*.

1. *H. quercus*, Saunders, Trans. Ent. Soc. Lond. (2), Vol. 1, p. 58 (1850). Epirus.

H. quercus, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 115 (1909).

2. *H. rubi*, Saunders, Trans. Ent. Soc. Lond. (2), Vol. 1, p. 57, pl. 8, Epirus.
ff. 1-3 (1850); Vol. 2, pl. 15, ff. 2-17 (1853). — **Pl. 4, Fig. 34;**
Pl. 5, Fig. 3.

H. rubi postulatus, Saunders, Trans. Ent. Soc. Lond. (1872).

H. rubi, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 114, 115, text fig. 3,
nos. 7, 8; pl. 5, ff. 1, 2 (1909).

3. *H. sieboldii*, Saunders, Trans. Ent. Soc. Lond. (2), Vol. 2, p. 143, pl. 16, Epirus.
f. 20 (1853).
H. sieboldii, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 115 (1909).

FAM. XENIDÆ

Xenidæ. Semenow, Rev. Russe d'Ent. Vol. 2, pp. 258-262 (1902); Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 76 (1908); Bull. U. S. Nat. Mus. no. 66, p. 115 (1909). — **Pl. 4, Fig. 5.**

Characters. — *Male.* — Antennæ four-jointed, with the third joint laterally produced; tarsi four-jointed, without claws.

Female. — Variable in form, but always having the metathoracic spiracles discernible; four or five median genital tubes entering brood-canal.

The family may conveniently be divided into three subfamilies based upon the structures of the thorax and oedeagus. The first two subfamilies strongly approach the two preceding families in thoracic structure.

TABLE OF SUBFAMILIES

1a. <i>Male metathoracic scutellum apically broadly truncate, not pedunculate, postlumbium more than half as long as wide.</i>	
2a. <i>Male maxillæ simple, two-jointed; oedeagus not conspicuously inflated at basal angle, sharply angulate at apical third. Female with five median genital tubes entering brood-canal</i>	1. Subfam. HALICTOXENINÆ, Pierce.
2b. <i>Male maxillæ three-jointed; oedeagus beginning as a slender tube, then greatly inflated, bent at right angles and produced as a very slender process</i>	2. Subfam. CRAWFORDINÆ, Pierce.
1b. <i>Male metathoracic scutellum pedunculate anteriorly, postlumbium short and transverse; oedeagus inflated at basal angle, sharply angulate at apical third. Female with four median genital tubes entering brood-canal</i>	3. Subfam. XENINÆ, Pierce.

I. SUBFAM. HALICTOXENINÆ, PIERCE

Halictoxeninæ. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 82 (1908); Bull. U. S. Nat. Mus. no. 66, p. 147 (1909).

Characters. — *Male.* — Maxillæ two-jointed. Metathoracic scutellum apically broadly truncate, not pedunculate; postlumbium more than half as long as wide. Oedeagus not conspicuously inflated at basal angle, sharply angulate at apical third.

Female. — Cephalothorax almost triangular, lateral margins sinuate; five genital tubes entering brood-canal.

TABLE OF GENERA

1a. *Male maxillæ with first joint longer than second; oedeagus strongly arcuate beneath at middle.* 1. Genus HALICTOXENOS, Pierce.

1b. *Male maxillæ with first joint shorter than second; oedeagus not strongly arcuate beneath at middle; wings with two detached branches of radius and two of medius, between radius and medius* 2. Genus APRACTELYTRA, Pierce.

I. GENUS HALICTOXENOS, PIERCE

Halictoxenos. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 82 (1908); Bull. U. S. Nat. Mus. no. 66, p. 147 (1909).

Characters. — *Male.* — Head and eyes normal. Maxillæ with first joint longer than second; mandibles straight on posterior edge, sides parallel to middle, where anterior edge is suddenly narrowed, thence tapering to a blunt apex. Antennæ four-jointed, the third joint laterally produced. Prothorax transverse. Mesothorax transverse; elytra long. Metathorax elongate; præscutum much broader in front than behind, posterior edge bisinuate; scuti rather widely separated; scutellum elongate, almost twice as long as præscutum, sides sinuately narrowing towards front, but not becoming approximate; post-lumbium very long; postscutellum elongate, apically rather broadly rounded. Tarsi four-jointed. Oedeagus evenly curved near base, strongly arcuate beneath at middle, probably angulate near apex.

Female. — Cephalothorax almost triangular, lateral margins sinuate; five genital tubes entering brood-canal.

The genus is divided into four subgenera on the basis of differences in the female cephalothorax. There is little doubt, but that each will be entitled to generic rank when the males are known.

TABLE OF SUBGENERA

1a. *Female cephalothorax triangular, narrowly and roundingly truncate at apex, obviously constricted at base of head; breadth of cephalothorax at widest point 1.9 to 2.3 times as wide as breadth of head at base.* 1. Subgen. HALICTOXENOS, Pierce.

1b. *Female cephalothorax less apparently triangular, broadly and evenly rounded to apex with very slight sinuations at sides; breadth of cephalothorax at widest point 1.4 times as wide as breadth of head at base.* 2. Subgen. HALICTOPHILUS, Pierce.

1c. *Female cephalothorax almost triangular, narrowly truncate at apex; head about one-third as wide as metathorax at spiracles* 3. Subgen. HALICTOSTYLOPS, Pierce.

1d. *Female cephalothorax very broad at base, triangular, convexly truncate at apex, strongly constricted at base of head; breadth of cephalothorax at widest point 1.5 times as wide as breadth of head at base.* 4. Subgen. AUGOCHLOROPHILUS, nov. subgen.

I. SUBGENUS HALICTOXENOS, PIERCE

Halictoxenus. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 82 (1908); Bull. U. S. Nat. Mus. no. 66, p. 148 (1909).

Type of subgenus. — *H. jonesi*, Pierce.

Geographical distribution of species. — Parasites of Halictine bees of the subgenus *Chloralictus*.

1. *H. crawfordi*, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 149, pl. 12, f. 1 Nebraska.
(1909).
2. *H. graenicheri*, Pierce, ibidem, p. 150, pl. 12, f. 2 (1909). Wisconsin.
3. *H. jonesi*, Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 84 (1908); Bull. U. S. Nat. Mus. no. 66, p. 14, pl. 13, ff. 1-3 (1909). — **Pl. 2, Fig. 3; Pl. 4, Fig. 21.**
4. *H. nymphaeari*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 496 (1911). Illinois.
5. *H. sparsi*, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 150, 151, pl. 12, f. 3 (1909). Oklahoma.
6. *H. versati*, Pierce, ibidem, p. 150, pl. 12, f. 4 (1909). Wisconsin.
7. *H. zephyri*, Pierce, ibidem, p. 150 (1909). Wisconsin.

2. SUBGENUS HALICTOPHILUS, PIERCE

Halictophilus. Pierce, Bull. U. S. Nat. Mus. no. 66, p. 148 (1909).

Type of subgenus. — *H. manilae*, Pierce.

Geographical distribution of species. — Parasites of Halictine bees of the subgenus *Evylaeus*.

8. *H. manilae*, Pierce, Bull. U. S. Nat. Mus. p. 151, pl. 12, f. 5 (1909). Philippines.
9. *H. robbii*, Pierce, ibidem, p. 151, pl. 12, f. 6 (1909). Philippines.

3. SUBGENUS HALICTOSTYLOPS, PIERCE

Halictostylops. Pierce, Bull. U. S. Nat. Mus. no. 66, p. 112 (1909).

Characters. — *Female*. — Cephalothorax triangular from stigmatal angles, narrowly truncate at apex; mandibles marginal; spiracles not lateral. Abdomen with five median genital tubes on the second to sixth segments.

Triungulinid. — Similar in form to that of *Stylops*. Tenth abdominal segment short, triangular, with two ventral tubercles as long as the segment and each bearing a long stylet.

Type of subgenus. — *H. spencii*, Nassonow.

Geographical distribution of species. — Parasites of bees of the genus *Halictus*.

10. *H. spencii*, Nassonow. England, continental Eu-
Halictophagus spencii, Nassonow, Warsaw University News, no. 9, pp. 18-22 rope.
pl. 1, ff. 10-12 (1893).
Halictophagus curtisi, Nassonow, Ent. Untersuch. pp. 93-97, pl. 1, ff. 10-12
(1893).
Halictostylops spencii, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 112, 113 (1909).

4. SUBGENUS AUGOCHLOROPHILUS, NOV. SUBGEN.

Type of subgenus. — *H. viridulae*, Pierce.

Geographical distribution of species. — Parasites of bees of the genus *Augochlora*.

11. *H. viridulae*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 496 (1911). Illinois.

2. GENUS APRACTELYTRA, PIERCE

Apractelytra. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 79 (1908); Bull. U. S. Nat. Mus. no. 66, pp. 151, 152 (1909).

Characters. — *Male*. — Head transverse, eyes not very prominent. Mandibles short, acute, slightly curved; maxillæ two-jointed, second joint more slender than first, but subequal in length. Antennæ compact, four-jointed, with third joint laterally produced. Prothorax and mesothorax transverse. Metathorax elongate; præscutum broader in front than behind, posterior edge with angular projection; scuti widely separated; scutellum elongate, twice as long as præscutum, sides narrowing toward front, but not becoming approximate; postlumbium very long; postscutellum elongate, apically narrowly rounded. Ædeagus not strongly arcuate beneath at middle, slender, tube-like, not inflated, bent at apical third at a right angle, apex abruptly acute.

Female unknown.

Type of genus. — *A. schwarzii*, Pierce.

Geographical distribution of species. — Hosts unknown.

1. *A. schwarzii*, Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 83 (1908); Bull. District of Columbia, U. S. Nat. Mus. no. 66, p. 152, pl. 10, ff. 3-6 (1909). — **Pl. 4,**
Fig. 22.

2. SUBFAM. CRAWFORDINÆ, PIERCE

Crawfordinæ. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 78 (1908); Bull. U. S. Nat. Mus. no. 66, p. 152 (1909).

Characters. — *Male*. — Maxillæ three-jointed. Metathoracic scutellum posteriorly broadly truncate, not pedunculate, postlumbium more than half as long as wide. Ædeagus beginning as a slender tube, then greatly inflated, bent at right angles, and produced as a very slender process.

Female. — Cephalothorax broad, trapezoidal, broadly truncate at apex

The subfamily includes only one genus, which is parasitic on bees of the family Panurgidæ.

1. GENUS CRAWFORDIA, PIERCE

Crawfordia. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 80 (1908); Bull. U. S. Nat. Mus. no. 66, p. 153 (1909).

Characters. — *Male*. — Head and eyes normal. Mandibles lancet-shaped, slender, toothed near tip, apically obliquely truncate; maxillæ apparently three-jointed, third joint very large. Antennæ four-

jointed, sensitive, with third joint laterally produced. Prothorax and mesothorax transverse, the latter twice as long as the former. Metathorax with praescutum much broader in front than behind, posterior edge squarely truncate; scuti widely separated; scutellum longer than praescutum, sides sinuately narrowing toward front, but not becoming approximate; postlumbium very long. Tarsi four-jointed. Oedeagus beginning as a slender tube, then greatly inflated, bent at right angles, and produced as a very slender process.

Female. — Cephalothorax broad, trapezoidal, prominent at spiracles, thence gently arcuate to apex, which is broadly truncate. Mandibles rather widely separated, triangular, toothed.

Type of genus. — *C. pulvinipes*, Pierce.

Geographical distribution of species. — Parasites of Panurgine bees of the genus *Panurginus*.

1. *C. cockerelli*, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 155, pl. 12, f. 8 (1909). New Mexico.
2. *C. pulvinipes*, Pierce. — Pl. 2, Fig. 4; Pl. 4, Fig. 23. Nebraska.

Xenos pulvinipes. Pierce, Nebraska University Studies, pp. 15-17, pl. 1,
ff. 1a-1f (1904).
C. pulvinipes, Pierce, Bull. U. S. Nat. Mus., no. 66, pp. 153-155, pl. 12,
f. 7; pl. 13, ff. 4-7 (1909).

Parasites of Panurgine bees of the genus *Pseudopanurgus*:

3. *C. labrosi*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 497 (1911). Illinois.
4. *C. rudbeckiae*, Pierce, ibidem, p. 497 (1911). Illinois.

3. SUBFAM. XENINÆ, PIERCE

Xeninæ. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 78 (1908); Bull. U. S. Nat. Mus. no. 66, p. 116 (1909).

Characters. — *Male.* — Maxillæ two-jointed. Metathoracic scutellum pedunculate anteriorly, postlumbium short and transverse. Oedeagus inflated at basal angle, sharply angulate at apical third.

Female. — Cephalothorax with head not considerably narrower than metathorax at spiracles, and laterally not extending back more than two-thirds of the distance to the spiracles. Four genital tubes entering brood-canal.

The subfamily contains thirteen genera which can only be temporarily arranged until more is known of them. This classification is necessarily unsatisfactory.

TABLE OF TRIBES AND GENERA

1a. Parasites of Vespidae	1. Tribus XENINI, Pierce.
2a. Males known; parasites of Polistes. Wings having eight primary veins from base, the third anal sometimes indistinct, radius sometimes broken for a short distance, one detached vein between radius and medius, and one behind medius.	1. Genus XENOS, Rossi. 2. Genus VESPÆXENOS, Pierce. 3. Genus BELONOGASTECHTHUS, Pierce.
2b. Males unknown; parasites of Vespa	2. Tribus PSEUDOXENINI, Pierce.
2c. Males unknown; parasites of Belonogaster	
1b. Parasites of Eumenidae	
3a. Males known; parasites of Odynerus. Wings having eight primary veins from base, and with two detached veins between radius and medius	1. Genus PSEUDOXENOS, Saunders. 2. Genus MONOBIAPHILA, Pierce.
3b. Males unknown; parasites of Monobia	

1c. *Parasites of Larridae*
 4a. *Males known; parasites of Tachytes*
 1d. *Parasites of Sphecidae*
 5a. *Parasites of Sphex; wings having eight primary veins from base, and with two detached veins between radius and medius, and one between medius and cubitus*
 5b. *Parasites of Chlorion; wings having seven primary veins from base, the third anal lacking, and with two detached veins between radius and medius, and one between medius and cubitus*
 5c. *Parasites of Sceliphron*
 1e. *Parasites of Bembecidae*
 6a. *Parasites of Bembecinus. Wings with eight primary veins from base, and with two detached veins between radius and medius*
 3. *Tribus TACHYTIKENINI, nov. tribus.*
 1. *Genus TACHYTIKES, nov. genus.*
 4. *Tribus OPHTHALMOCHLINI, Pierce.*
 1. *Genus EUPATHOCERA, Pierce.*
 2. *Genus OPHTHALMOCHLUS, Pierce.*
 3. *Genus SCELIPHRONECHTHRUS, Pierce.*
 5. *Tribus PARAXENINI, Pierce.*
 1. *Genus PARAXENOS, Saunders.*

I. TRIBUS XENINI, PIERCE

Xenides. Saunders, Trans. Ent. Soc. Lond. p. 35 (1872).

Xenini. Pierce, Bull. U. S. Nat. Mus. no. 66, p. 116 (1909).

Characters. — *Male.* — Metathoracic praescutum keystone-shape, strongly convex in front; scuti very narrowly separated by scutellum, but not locking it; postlumbium more than twice as wide as long; postscutellum elongate, sides not parallel beyond middle, converging to a narrowly rounded apex.

Female. — Cephalothorax usually heavily pigmented at base, and not with lighter spot over spiracles; cephalothorax at spiracles 1.17 to 1.46 times wider than head at base; head 3.36 to 4.68 times wider than distance between mandibles.

The tribe is formed to contain the three genera parasitic on Vespidae.

I. GENUS XENOS, ROSSI

Xenos. Rossi, Fauna Etrusca, Mant. Ins. App. p. 114 (1790); Kirby, Trans. Linn. Soc. Lond. Vol. 11, pp. 113-116 (1813); Saunders, Trans. Ent. Soc. Lond. p. 37 (1872).

Xenus. Rye, Zool. Record, Vol. 10, p. 293 (1875).

Acroschismus. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 79 (1908).

Schistosiphon. Pierce, ibidem, p. 80 (1908).

Xenos. Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 116, 117 (1909).

Acroschismus. Pierce, ibidem, pp. 119-122 (1909).

Schistosiphon. Pierce, ibidem, pp. 132, 133 (1909).

Xenos. Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 497 (1911).

Characters. — *Male.* — Head transverse, eyes prominent, many-faceted. Mandibles slender, sinuate, ensiform, apically acute: maxillæ two-jointed, the second joint usually shorter than the first. Antennæ very sensitive, four-jointed, the third laterally produced, the flabelli of third and fourth

flattened. Prothorax and mesothorax transverse, arcuate anteriorly, roundly excavate posteriorly, longest on lateral margins. Elytra about as long as width of thorax, club-shaped. Mesopleuræ bearing a very distinct lobe protecting the entrance of the mesostigma. Metathorax elongate; præscutum rounded in front, broadest at anterior third; scuti narrowly separated by scutellum; scutellum elongate triangular, with sides sinuate and apex narrowly truncate; postlumbium transverse, of a different consistency from the other parts; postscutellum elongate, sides converging from middle to rather narrowly rounded apex. Wings having eight primary veins from base, the third anal sometimes indistinct, radius sometimes broken for a short distance, one detached vein between radius and medius and often one behind medius. Coxæ contiguous. Tarsi four-jointed, without claws. Ædeagus inflated and bent near base, becoming tube-like, and sharply bent again before apex, which is acute, genital pore between last bend and apex, on outer side.

Female. — Cephalothorax not as a rule abruptly narrowed behind stigmatal angle, elongate trapezoidal, obtuse or truncate at apex. Stigmata seldom laterally prominent. Mouth ventral, with mandibles on each side, rather broad and obtuse. Abdomen with four median genital tubes on second to fifth segments.

Triungulinid. — Body oblong, slightly narrowing posteriad. First eight segments normal, ninth greatly elongate, deeply emarginate for tenth, which is elongate and terminated by two stylet-bearing lobes, contiguous at base.

Type of genus. — *X. vesparum*, Rossi.

Geographical distribution of species. — Parasites of wasps of the genus *Polistes*.

1. *X. auriferi*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 498 (1911). California.
2. *X. bowditchi*, Pierce. *Acroschismus bowditchi*, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 130, pl. 7, ff. 2, 6, 11; pl. 9, f. 1 (1909). Massachusetts, Ohio.
3. *X. bruesi*, Pierce. *Acroschismus bruesi*, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 124, 125, pl. 5, ff. 7, 10, 11; pl. 9, f. 2 (1909). Michigan.
4. *X. hubbardi*, Pierce. *Acroschismus hubbardi*, Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 84 (1908); Bull. U. S. Nat. Mus. no. 66, pp. 122-124, pl. 6, ff. 1-12; pl. 9, f. 3 (1909). Florida.
5. *X. hunteri*, Pierce. *Acroschismus hunteri*, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 130, 131, pl. 7, f. 10, pl. 9, f. 4 (1909). Texas.
6. *X. jurinei*, Saunders, Trans. Ent. Soc. Lond. p. 39 (1872). *X. vesparum*, Jurine, Mem. Accad. Sc. Torino, Vol. 23, pp. 50-62, pl. 1 (1818). Switzerland.
7. *X. maximus*, Pierce. *Acroschismus maximus*, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 132, pl. 9, f. 8 (1909). Texas.
8. *X. nigrescens*, Brues, Zool. Jahrb. Vol. 18, no. 2, p. 247 (1903). *Acroschismus nigrescens*, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 125, 126 (1909). Texas.
9. *X. pallidus*, Brues, Zool. Jahrb. Vol. 18, no. 2, p. 246, f. Bb (1903); Biol. Bull. Vol. 8, no. 5, p. 295, f. 2 (1905). — **Pl. 4, Figs. 1, 2, 36, 41.** *Acroschismus pallidus*, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 126, 127 (1909). var. *texensis*, Pierce, ibidem, pp. 127, 128 (1909). Texas.
10. *X. peckii*, Kirby, Trans. Linn. Soc. Lond. Vol. 11, pp. 116, 117, pls. 8, 9 (1813). *Schistosiphon peckii*, Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 80 (1908); Bull. U. S. Nat. Mus. no. 66, p. 133, pl. 5, ff. 5, 6 (1909). Massachusetts.

11. *X. pecosensis*, Pierce. Texas.
Acroschismus pecosensis, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 128, 129,
pl. 7, ff. 3, 7, 12; pl. 8, ff. 1, 4; pl. 9, f. 7 (1909).

12. *X. rubiginosi*, Pierce. Louisiana.
Acroschismus rubiginosi, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 132, pl. 9,
f. 11 (1909).

13. *X. texani*, Pierce. Texas.
Acroschismus texani, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 132, pl. 9,
f. 9 (1909).

14. *X. wheeleri*, Pierce. Connecticut.
X. peckii, Brues, Zool. Jahrb. Vol. 18, no 2, ff. B a, C (1903).
Acroschismus wheeleri, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 129, 130,
pl. 5, ff. 8, 9, 12, 13; pl. 9, f. 10 (1909).

15. *X. vesparum*, Rossi, Fauna Etrusca, Mant. App. p. 14 (1790). — Pl. I, Italy, Austria.
Fig. 6; Pl. 4, Fig. 24; Pl. 5, Figs. 14, 15.
X. rossii, Kirby, Trans. Linn. Soc. Lond. Vol. 11, p. 116 (1813).
X. vesparum, Pierce, Bull. U. S. Nat. Mus. no 66, pp. 117, 118; text fig. 2,
nos. 15-17; pl. 5, f. 4; pl. 7, ff. 4, 8, 13 (1909).

2. GENUS VESPÆXENOS, PIERCE

Vespæxenos. Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 133, 134 (1909).

Characters. — *Male* unsatisfactorily described.

Female. — Very large, similar in form to that of *Xenos*.

Triungulinid. — In general similar to that of *Xenos*.

Type of genus. — *V. crabronis*, Pierce.

Geographical distribution of species. — Parasites of wasps of the genus *Vespa*.

1. *V. buyssoni*, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 134, 135 (1909). Annam.
Xenos moutoni, Buysson, Rev. Ent. Caen, Vol. 25, p. 11 (1906).

2. *V. crabronis*, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 134 (1909). Japan.

3. *V. moutoni*, Buysson. China.
Xenos moutoni, Buysson, Bull. Soc. Ent. Fr. p. 174 (1903).
V. moutoni, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 134 (1909).

3. GENUS BELONOGASTECHTHRUS, PIERCE

Belonogastechthrus. Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 498 (1911).

Characters. — *Male* unknown.

Female. — Very similar in form to *Xenos*.

Triungulinid. — Apically armed with four long stylets.

Type of genus. — *B. zavattarii*, Pierce.

Geographical distribution of species. — Parasites of wasps of the genus *Belonogaster*.

1. *B. zavattarii*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 498 (1911). Congo Free State.

2. TRIBUS PSEUDOXENINI, PIERCE

Pseudoxenides. Saunders, Trans. Ent. Soc. Lond. p. 40 (1872).

Pseudoxenini. Pierce, Bull. U. S. Nat. Mus. no. 66, p. 135 (1909).

Characters. — This tribe is merely a loosely formed grouping to contain the two genera of odynerid parasites until they are more completely defined.

I. GENUS PSEUDOXENOS, SAUNDERS

Pseudoxenos. Saunders, Trans. Ent. Soc. Lond. p. 44 (1872); Pierce, Bull. U. S. Nat. Mus. no. 66, p. 135 (1909); Proc. U. S. Nat. Mus. Vol. 40, p. 498 (1911).

Leionotoxenos. Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 137, 138 (1909).

Characters. — *Male.* — Head transverse, eyes prominent. Mandibles elongate, cuneiform; maxillæ with second joint longer than first. Wings having eight primary veins from base, and with two detached veins between radius and medius. Tarsi four-jointed, without claws.

Female. — Cephalothorax broadly oval, unevenly rounded from base to apex, broadest behind spiracles, angled at base of head, obtusely rounded at apex. Mandibles dentate, emarginate at apex.

Triungulinid. — Head elongate. First eight abdominal segments short, but normal, ninth segment elongate, as long as the three preceding, deeply emarginate for tenth; tenth segment hardly surpassing the lateral prolongations of the ninth, apically provided with two contiguous stylet-bearing lobes.

Type of genus. — *P. schaumii*, Saunders.

Geographical distribution of species. — Parasites of wasps of the genus *Odynerus*.

1. <i>P. arvensidis</i> , Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 499 (1911).	Illinois.
2. <i>P. corecyricus</i> , Saunders.	Corcyra.
<i>Paraxenos corecyricus</i> , Saunders, Trans. Ent. Soc. Lond. p. 46 (1872).	
<i>Pseudoxenos corecyricus</i> , Pierce, Bull. U. S. Nat. Mus. no. 66, p. 137 (1909).	
3. <i>P. erynnidis</i> , Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 499 (1911).	Florida.
4. <i>P. foraminati</i> , Pierce, ibidem, p. 499 (1911).	Illinois.
5. <i>P. fundati</i> , Pierce, ibidem, p. 500 (1911).	Illinois.
6. <i>P. heydenii</i> , Saunders.	Epirus, Corcyra.
<i>Xenos heydenii</i> , Saunders, Trans. Ent. Soc. Lond. (2), Vol. 2, p. 17, pl. 15, ff. 15-24 (1853).	
<i>P. heydenii</i> , Saunders, Trans. Ent. Soc. Lond. p. 45 (1872); Pierce, Bull. U. S. Nat. Mus. no. 66, p. 137 (1909).	
7. <i>P. histrionis</i> , Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 500 (1911).	Florida.
8. <i>P. hookeri</i> , Pierce.	Texas.
<i>Leionotoxenos hookeri</i> , Pierce, Bull. U. S. Nat. Mus. no. 66, p. 139, text. fig. 1; pl. 11, f. 2 (1909).	
9. <i>P. jonesi</i> , Pierce.	Louisiana, Texas.
<i>Leionotoxenos jonesi</i> , Pierce, Bull. U. S. Nat. Mus. no. 66, p. 138, pl. 11, f. 3 (1909).	
10. <i>P. klugii</i> , Saunders.	Epirus.
<i>Xenos klugii</i> , Saunders, Trans. Ent. Soc. Lond. (2), Vol. 2, p. 18, pl. 15, f. 9-14 (1853).	
<i>P. klugii</i> , Saunders, Trans. Ent. Soc. Lond. p. 45 (1872); Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 136, 137 (1909).	

11. *P. louisianae*, Pierce. Louisiana, Nebraska.
Leionotoxenos louisianae, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 138, pl. 11,
f. 4 (1909).

12. *P. pedestridis*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 500 (1911). Illinois.

13. *P. robertsoni*, Pierce, ibidem, p. 501 (1911). Illinois.

14. *P. schaumii*, Saunders, Trans. Ent. Soc. Lond. p. 44, pl. 7, f. 6-12 Corcyra.
(1872). — PI 5, Fig. 7.
P. schaumii, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 135, pl. 10, f. 2 (1909).

15. *P. tigridis*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 501 (1911). Illinois.

2. GENUS MONOBIAPHILA, PIERCE

Monobiaphila. Pierce, Bull. U. S. Nat. Mus. no. 66, p. 139 (1909).

Characters. — *Male* unknown.

Female. — Cephalothorax broader than long, constricted at base, broadest at spiracles, convex from base to spiracles, slightly oblique, but very nearly straight from spiracles to base of head, at which point there is a slight emargination, thence very oblique to mandibles, apex convex. Mandibles broad, apically emarginate between the long curved tooth and the obtuse outer angle.

Triungulinid. — Similar to that of *Pseudoxenos*.

Type of genus. — *M. bishoppi*, Pierce.

Geographical distribution of species. — Parasites of wasps of the genus *Monobia*.

1. *M. bishoppi*, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 139, 140; pl. 11, Texas.
f. 1 (1909).

3. TRIBUS TACHYTIXENINI, NOV. TRIBUS

Characters. — This tribe is like the others only established for convenience until all of the genera in the Xeninæ can be studied alike. It is to contain under this temporary arrangement the parasites of the Larridæ.

I. GENUS TACHYTIXENOS, PIERCE

Tachytixenos. Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 501 (1911).

Characters. — *Male.* — Head transverse, broadly produced over the antennæ. Mandibles curved, stout, ensiform, apically acute, maxillæ two-jointed, the first joint stout subclavate, the second longer, tapering, but not acute at apex. Eyes large, many-faceted. Antennæ normally xeniform, rami flattened. Prothorax transverse, slightly arched forward. Mesothorax shorter, emarginate by præscutum; elytra slender, clavate. Metathoracic præscutum keystone-shape; scuti broad, angularly produced over base of wings, narrowly separated by peduncle of scutellum; scutellum reaching præscutum in a pedunculate process which widens to the main body in a sinuate curve, posterior angles laterally produced, posterior edge bisinuate; postlumbium of different consistency from other parts, with both anterior and posterior edges bisinuate; postscutellum broad, strongly convex. Wing venation light. Legs moderate, posterior femora inflated behind. Oedeagus with almost no curve beneath at base and with the first outer bend very near base, reflexed at the apical fourth at about a right angle, apex very acute.

Female. — Cephalothorax slightly constricted at base, wider than long, widest behind spiracles; spiracles not laterally prominent, mandibles subquadrate, toothed on inner angle, sides convex, apex sinuately convex.

Type of genus. — *T. indicus*, Pierce.

Geographical distribution of species. — Parasites of wasps of the genus *Tachytes*.

1. *T. indicus*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 502 (1911). — India.
Pl. 4, Fig. 25.

4. TRIBUS OPHTHALMOCHLINI, PIERCE

Ophthalmochlini. Pierce, Bull. U. S. Nat. Mus. no. 66, p. 141 (1909).

Homilopinæ. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 80 (1908).

Characters. — This tribe is rather arbitrarily formed to include the genera parasitic on Sphecidæ, until a more logical classification can be devised.

I. GENUS EUPATHOCERA, PIERCE

Eupathocera. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 79 (1908); Bull. U. S. Nat. Mus. no. 66, p. 143 (1909).

Characters. — *Male.* — Head transverse, vertex medianly produced in a high ridge, on each side of which arise the antennæ. Mandibles flattened, scimitar-like; maxillæ two-jointed. Antennæ typically xenid. Prothorax and mesothorax transverse. Metathorax elongate; præscutum subquadrate, broadest at base, truncate at apex, scuti separated narrowly by apex of scutellum; scutellum triangular; postlumbium very short, transverse and not differently colored or of different consistency from the other parts. Wings with eight primary veins; with two detached veins between radius and medius and one between medius and cubitus. Cœdeagus inflated and angulate near base, thence tapering to apical fourth, at which point it is again bent at a right angle, and thence tapers to a very sharp point.

Female. — Cephalothorax widest behind spiracles, more or less evenly convex throughout; spiracles dorsal; mandibles subquadrate with a large tooth on inner apical angle.

Triungilinid. — Similar to that of *Pseudoxenos*.

Type of genus. — *E. lugubris*, Pierce.

Geographical distribution of species. — Parasites of wasps of the genus *Sphex* (*Ammophila*).

1. *E. lugubris*, Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 83 (1908); Bull. Ohio. U. S. Nat. Mus. no. 66, p. 143, pl. 10, ff. 11, 12, 14 (1909). — Pl. 2,
Fig. 1; Pl. 4, Fig. 26.
2. *E. pictipennidis*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, pp. 502, 503 (1911). Illinois.
3. *E. pruinosa*, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 143, 144, pl. 11, f. 7 (1909). Colorado.
4. *E. sphecidarum*, Dufour. France, Germany.
Xenos sphecidarum, Dufour, Ann. Sc. Nat. (2), Zool. Vol. 7, pp. 18, 19,
pl. 1, f. 16 (1837).
Paraxenos sieboldii, Saunders, Trans. Ent. Soc. Lond. p. 47 (1872).
E. sphecidarum, Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 79 (1908).
5. *E. vulgaridis*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 503 (1911). Illinois.

Parasites of wasps of the subgenus *Psammophila* :

6. *E. luctuosae*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 502 (1911). Idaho, Colorado.

Parasites of wasps of the genus *Miscus* :

7. *E. sieboldii*, Saunders. Germany.

Paraxenos sieboldii. Saunders, Trans. Ent. Soc. Lond. p. 47 (1872).
E. sieboldii. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 79 (1908).

2. GENUS OPHTHALMOCHLUS, PIERCE

Ophthalmochlus. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 79 (1908); Bull. U. S. Nat. Mus. no. 66, p. 142 (1909).

Characters. — *Male*. — Head transverse; vertex medianly produced in a high ridge, on each side of which arise the antennæ. Mandibles very acute and curved near tip; maxillæ two-jointed. Prothorax and mesothorax transverse. Metathorax elongate; præscutum bisinuate at base, truncate at apex, subquadrate; scuti approximate for a short distance, making the scutellum distinctly pedunculate; scutellum triangular, pedunculate at each angle, sides convex; postlumbium transverse, of a different texture and color from the surrounding parts; postscutellum elongate, convex, sides parallel, apex convex. Ædeagus similar to that of *Eupathocera*. Tarsi four-jointed, without claws.

Female. — Cephalothorax broader than long, margins irregularly convex, constricted at base, rounded at apex. Mandibles oblique, acutely toothed on inner angle, emarginate between this and prominently rounded outer angle.

Triungulinid. — Similar to that of *Pseudoxenos*.

Type of genus. — *O. duryi*, Pierce.

In order to facilitate the classification of the species the genus has arbitrarily been divided into subgenera according to the host habits.

I. SUBGENUS OPHTHALMOCHLUS, NOV. SUBGEN.

Type of subgenus. — *O. duryi*, Pierce.

Geographical distribution of species. — Parasites of wasps of the genus *Chlorion*, subgenus *Priononyx*.

1. *O. duryi*, Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 83 (1908); Bull. U. S. Nat. Mus. no. 66, pp. 142, 143; pl. 10, ff. 7, 8, 13 (1909). — **Pl. 2, Fig. 2; Pl. 4, Fig. 27.**

2. SUBGENUS HOMILOPS, PIERCE

Homilops. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 80 (1908); Bull. U. S. Nat. Mus. no. 66, pp. 145, 146 (1909).

This subgenus was erected as a genus because of Templeton's attributing three-jointed maxillæ to his species. It is now believed best to consider it merely as a convenience group.

Type of subgenus. — *O. westwoodii*, Templeton.

Geographical distribution of species. — Parasites of wasps of the genus *Chlorion*, subgenus *Proterosphex*.

2. *O. abbotti* (*Homilops*). Pierce, Bull. U. S. Nat. Mus. no. 66, p. 147 (1909). Siam.
3. *O. ashmeadi* (*Homilops*). Pierce, ibidem, pp. 146, 147, pl. 11, f. 8 (1909). Santo Domingo.
4. *O. bishoppi* (*Homilops*). Pierce, ibidem, p. 146; pl. 11, f. 6 (1909). Texas.
5. *O. westwoodi*, Templeton. Brazil.
Xenos westwoodi, Templeton, Trans. Ent. Soc. Lond. Vol. 3, pp. 51-56; pl. 4, ff. A-E (1838).
Homilops westwoodi, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 146; pl. 10, ff. 9, 10 (1909).

3. SUBGENUS ISODONTIPHILA, NOV. SUBGEN.

Type of subgenus. — *O. auripedis*, Pierce.

Geographical distribution of species. — Parasites of wasps of the genus *Chlorion*, subgenus *Isodontia*.

6. *O. auripedis*, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 503 (1911). Pennsylvania, Maryland.

3. GENUS SCELIPHRONECHTHRUS, PIERCE

Sceliphronechthrus. Pierce, Bull. U. S. Nat. Mus. no. 66, p. 141 (1909).

Characters. — *Female*. — Cephalothorax slightly constricted at base, thence obliquely widening to widest point, just behind the spiracles, which are lateral, but hardly prominent, thence sinuately convex to apex; mandibles dentate on inner apical angle.

Type of genus. — *S. fasciati*, Pierce.

Geographical distribution of species. — Parasites of wasps of the genus *Sceliphron*.

1. *S. fasciati*, Pierce. Bull. U. S. Nat. Mus. no. 66, p. 142 (1909). Santo Domingo.

5. TRIBUS PARAXENINI, PIERCE

Paraxenini. Pierce. Bull. U. S. Nat. Mus. no. 66, p. 140 (1909).

Characters. — A temporary tribe to include a genus of parasites of the Bembecidæ.

I. GENUS PARAXENOS, SAUNDERS

Paraxenos. Saunders, Trans. Ent. Soc. Lond. pp. 45, 46, pl. 7, ff. 5, 13-15 (1872); Pierce, Bull. U. S. Nat. Mus. no. 66, p. 140, pl. 10, f. 1 (1909).

Characters. — *Male*. — Head transverse. Mandibles broader at base, arcuate; maxillæ with basal joint stout, arcuate; palpus cylindrical. Antennæ typically xenid. Wings with eight primary veins from base, and with two detached veins between radius and medius. Tarsi four-jointed, without claws.

Type of genus. — *P. erberi*, Saunders.

Geographical distribution of species. — Parasites of wasps of the genus *Bembecinus*.

1. *P. erberi*, Saunders, Trans. Ent. Soc. Lond. p. 46, pl. 7, ff. 5, 13-15 Corcyra (1872). — PI. 5, FIG. 8.

P. erberi, Pierce. Bull. U. S. Nat. Mus. no. 66, p. 141, pl. 10, f. 1 (1909).

SUPERFAM. STICHOTREMATOIDEA

Stichotrematoidea. Hofeneder, Zool. Anzeig. Vol. 36, p. 49 (1910).

Characters. — *Male* unknown.

Female. — Genital pores arranged in three transverse series of twelve to fourteen each.

FAM. STICHOTREMATIDÆ

Stichotrematidæ. Hofeneder, Zool. Anzeig. Vol. 36, p. 49 (1910).

Characters. — *Male* unknown.

Female. — As described above.

Triungulinid. — Similar to that of preceding and following families.

I. GENUS STICHOTREMA, HOFENEDER

Stichotrema. Hofeneder, Zool. Anzeig. Vol. 36, pp. 47-49 (1910).

Characters. — *Male* unknown.

Female. — Dorsum outward. Genital canals arranged in three parallel rows on the first or second abdominal segment, with twelve to fourteen in each row. Cephalothorax with lateral projection behind the spiracles. Head with two small projections, probably rudimentary maxillæ.

Type of genus. — *S. dallatorreanum*, Hofeneder.

Geographical distribution of species. — Parasites of grasshoppers of the genus *Sexava*.

1. *S. dallatorreanum*, Hofeneder, Zool. Anzeig. Vol. 36, pp. 47-49, fig. (1910). Admiralty Islands.

S. dallatorreanum, Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 504 (1911).

SUPERFAM. HALICTOPHAGOIDEA

Halictophagoidea. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 76 (1908); Bull. U. S. Nat. Mus. no. 66, p. 155 (1909).

Characters. — *Male.* — Tarsi with three joints.

Female. — Head with apical tubercles; spiracles not usually discernible, never prominent.

The superfamily contains two families parasitic on the Tetigonidæ.

TABLE OF FAMILIES

ra. <i>Male antennæ four-jointed, with the flabellum of the third, and the fourth joint elongate, subequal</i>	1. Fam. DIOZOCERIDÆ, Pierce.
rb. <i>Male antennæ seven-jointed, with the third, fourth, fifth and sixth joints laterally produced and the seventh elongate</i>	2. Fam. HALICTOPHAGIDÆ, Pierce.

FAM. DIOZOCERIDÆ

Dioxoceridæ. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 76 (1908); Bull. U. S. Nat. Mus. no. 66, p. 163 (1909).

Diozoceridæ. Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 504 (1911).

Characters. — *Male.* — Antennæ four-jointed, as in Xenidæ. Tarsi three-jointed.

I. GENUS DIOZOCERA, PIERCE

Dioxocera. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 81 (1908) (typographical error); Bull. U. S. Nat. Mus. no. 66, p. 163 (1909).

Diozocera. Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 504 (1911) (application made to International Commission of Nomenclature for authority to emend).

Characters. — *Male.* — Head transverse. Antennæ four-jointed, xeniform. Prothorax and mesothorax transverse. Metathorax elongate; præscutum elongate, once and a half as long as wide at base, sides converging apically. apex rounded; scuti long, separated by præscutum and scutellum; scutellum subtriangular, apically broadly convexly truncate, basal angles prolonged; postlumbium

elliptic, of different texture from the other parts; postscutellum elongate, sides parallel, convex, apically rounded. Tarsi three-jointed.

Female. — Cephalothorax subquadrate, with sides rounded; mandibles apical and prominent, mouth opening subapical; transverse slit behind the middle, straight in median half, but deeply retreating at sides.

Type of genus. — *D. insularum*, Pierce.

Geographical distribution of species. — Parasites of leaf-hoppers of the genus *Xerophloea*.

1. *D. insularum*, Pierce. — **Pl. 2, Fig. 5; Pl. 4, Fig. 37.** Isl. Grenada, St. Vincent.

Dioxocera insularum, Pierce. Proc. Ent. Soc. Wash. Vol. 9, p. 81 (1908);

Bull. U. S. Nat. Mus. no. 66, p. 164, text fig. 3, nos. 11a, 11b, 12;
pl. 14, ff. 9, 10 (1909).

Diozocera insularum, Pierce. Proc. U. S. Nat. Mus. Vol. 40, p. 504 (1911).

FAM. HALICTOPHAGIDÆ

Halictophaginæ. Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Assoc. Bull. 1, Pt. 3, p. 99 (1905).

Halictophagidæ. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 76 (1908); Bull. U. S. Nat. Mus. no. 66, p. 155 (1909).

Characters. — *Male.* — Antennæ seven-jointed, with the third, fourth, fifth and sixth joints laterally produced, and seventh elongate; tarsi three-jointed.

Female. — Tuberles of head apical.

TABLE OF SUBFAMILIES

<i>Prothorax visible only on notum and sternum; wings with six or seven primary veins.</i>	1. Subfam. ANTHERICOMMINÆ, nov. subfam.
<i>Prothorax band-like, not interrupted; wings with seven primary veins.</i>	2. Subfam. HALICTOPHAGINÆ, Perkins.

I. SUBFAM. ANTHERICOMMINÆ, NOV. SUBFAM.

Characters. — *Male.* — Prothorax visible only on notum and sternum. Wings with six or seven primary veins.

So far as known this subfamily is parasitic on Tetigoniidæ.

TABLE OF GENERA (MALES)

1a. <i>Praescutum elongate, oblong, several times longer than scutellum and postlumbium together</i>	1. Genus ANTHERICOMMA, Pierce.
1b. <i>Praescutum but little longer than scutellum and postlumbium together.</i>	
2a. <i>Scutellum transverse, very broadly convex in front</i>	2. Genus PENTACLADOCERA, Pierce.
2b. <i>Scutellum as long as wide, with exception of postero-lateral prolongations.</i>	
3a. <i>Scutellum narrowly lobate in front, very narrowly separated from praescutum; oedeagus slender, inflated at base and strongly arched, thence becoming very slender and at apex very acutely reflexed</i>	4. Genus PENTOZOE, Pierce.
3b. <i>Scutellum convex, not lobate in front, more widely separated from praescutum, oedeagus slender, not greatly enlarged at base and obtusely angulate, but acutely angulate at apex.</i>	5. Genus PENTOZOCERA, Pierce.

TABLE OF GENERA (FEMALES)

1a. Head subtruncate at apex, transverse slit very broad, cutting a deep three-sided emargination in the head 3. Genus AGALLIAPHAGUS, Pierce.

1b. Transverse slit narrow; thorax shorter than head, rather suddenly narrowed to base; sides of head oblique 5. Genus PENTOZOCERA, PIERCE.

I. GENUS ANTERICOMMA, PIERCE

Anthericoma. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 81 (1908); Bull. U. S. Nat. Mus. no. 66, p. 162 (1909).

Characters. — *Male.* — Head transveræ, closely and coarsely punctate, eyes many faceted. Mandibles very short, pubescent; maxillæ cylindrical two-jointed, the second longer. Antennæ seven-jointed, the prolongations of the last five joints flattened, foliaceous, of graduated length, the apical being shortest. Pronotum obovate, disk-like, not connected externally with the prosternum, projecting about equally into emarginations of the head and mesonotum. Mesonotum very deeply emarginate for reception of pronotum, but laterally reaching head; basal margin straight. Elytra rather short. Metathorax with præscutum oblong, slightly widest at base, truncate at apex; scuti narrowly elongate, not longer than præscutum; scutellum very short, base convex, apex truncate, sides concave; postlumbium transverse, very short; postscutellum very long. Wings as in *Neocholax*, but lacking both cubitus and third anal. Prosternum a mere rounded, oblong disk; propleuræ lacking. Anterior coxæ and trochanters contiguous; middle coxæ separated.

Female unknown.

Type of genus. — *A. barberi*, Pierce

Geographical distribution of species. — Hosts unknown.

1. *A. barberi*, Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 84 (1908); Bull. U. S. New Mexico. Nat. Mus. no. 66, pp. 162, 163; text fig. 3, nos. 13, 14; pl. 14, ff. 5-8 (1909). — Pl. 3, Fig. 1; Pl. 4, Fig. 38.

2. GENUS PENTACLADOCERA, PIERCE

Pentacladocera. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 80 (1908); Bull. U. S. Nat. Mus. no. 66, p. 157 (1909).

Characters. — *Male.* — Head short and transverse. Mandibles very short and stout, abruptly acute at apex, not reaching each other; maxillæ with first joint extremely slender and second more than twice as long and largest beyond middle, apically acute. Antennæ seven-jointed, the third to sixth joints laterally produced, but the branches not compressed at base, seventh joint thin and lamellate. Prothorax causing deep emargination of head, not visible at sides. Mesothorax transverse. Metathorax with præscutum elongate, subtriangular, broadest in front, narrowly rounded behind; scuti oblique, narrowly separated; scutellum transverse, with all sides sinuate; postlumbium transverse, subquadrate, shorter than scutellum, not differently colored; postscutellum a little longer than all the preceding parts. Wings with seven primary veins from base, radius meeting costal margin beyond middle, medius unbroken, an-

indistinct distal vein behind the apex of radius and a distinct detached vein in front of medius, cubitus lacking. Tarsi as in *Pentozocera*. Oedeagus similar to that of *Pentozocera*.

Female unknown.

Type of genus. — *P. schwarzii*, Perkins.

Geographical distribution of species. — Parasites of leafhoppers of the genus *Agallia*.

1. *P. schwarzii*, Perkins. — **Pl. 3, Fig. 2; Pl. 6, Fig. 13.** New South Wales.
Halictophagus (?) schwarzii, Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Ass. Bull. 1, Pt. 3, pp. 104, 105, pl. 1, ff. 2, 7; pl. 2, f. 2 (1905).
P. schwarzii, Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 80 (1908); Bull. U. S. Nat. Mus. no. 66, p. 157, pl. 13, ff. 13, 14 (1909).

3 GENUS AGALLIAPHAGUS, PIERCE

Agalliaphagus. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 83 (1908); Bull. U. S. Nat. Mus. no. 66, pp. 159, 160 (1909).

Characters. — *Male* unknown.

Female. — Cephalothorax suboblong, the anterior median area distinct in apical view, but generally hardly visible in surface view, owing to its position on the apex of the head, which is bent at an angle to the outer surface, tuberculate on either side of this area; the whole disk of the head deeply impressed so as to form a great cavity leading into the opening of the brood-chamber.

Type of genus. — *A. americanus*, Perkins.

Geographical distribution of species. — Parasites of leafhoppers of the genus *Agallia*.

1. *A. americanus*, Perkins. — **Pl. 4, Fig. 9.** Ohio.
Halictophagus (?) americanus, Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Assoc. Bull. 1, Pt. 3, p. 105, pl. 3, f. 6 (1905).
A. americanus, Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 83 (1908); Bull. U. S. Nat. Mus. no. 66, p. 160 (1909).

4. GENUS PENTOZOE, PIERCE

Pentozoe. Pierce, Proc. U. S. Nat. Mus. Vol. 40. p. 505 (1911).

Characters. — *Male*. — Head excavated behind, produced over antennæ. Eyes many faceted. Antennæ with flabelli short, flat and broad. Mandibles short and acute, slightly passing each other; maxillæ long, second joint long. Prothorax and mesothorax arched far forward into head, the former appearing only as a disk. Elytra moderately long. Præscutum elongate triangular, narrowly truncate by scutellum; scuti quadrate, diagonal, approximate at apex of præscutum, not reaching to lateral processes of scutellum; scutellum with median anterior lobe separating scuti, behind which it is more or less quadrate with postero-lateral prolongations; postlumbium of different consistency from the other parts, and almost as long as the scutellum; postscutellum convex, broad and about as long as præscutum and scutellum together. Wings with seven primary veins, the costa and subcosta strong, the area between these and medius darkened; a very wide detached vein arising just beyond the darkened area; medius extending to margin with long detached branch in front of it; the two anal veins straight. Legs normal; tarsi three-jointed. Ninth abdominal segment elongate; oedeagus slender, inflated at basal third and strongly arched, thence very slender and at apical fourth bent back in an acute angle.

Female. — Cephalothorax quadrate, bi-emarginate at apex, with the lobe thus formed very prominent; mandibles oblique and strongly toothed; spiracles subbasal, but not prominent.

Type of genus. — *P. peradeniya*, Pierce.

Geographical distribution of species. — Parasites of leafhoppers of the genus *Thompsoniella*.

1. *P. peradeniya* Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 505 (1911). — Ceylon.

Pl. 3, Fig. 3; Pl. 4, Fig. 40.

5. GENUS PENTOZOCERA, PIERCE

Bruesia. Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Ass. Bull. 1, Pt. 3, p. 102 (1905) (preoccupied).

Pentoxocera. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 80 (1908) (typographical error); Bull. U. S. Nat. Mus. no. 66, pp. 157, 158 (1909).

Pentozocera. Pierce, Proc. U. S. Nat. Mus. Vol. 40, p. 504 (1911) (emendation).

Characters. — *Male.* — Head very deeply concave behind, seen from above consisting only of a narrow rim supporting the eyes and produced considerably in front of these to form the tip of the blunt and wide frontal projection, at the sides of which the antennæ are inserted. Mandibles very short, not reaching one another; maxillæ with first joint slender, enlarged toward apex, second joint foliaceous, pilose, almost half as wide as long. Antennæ seven-jointed, with the two basal joints simple, the following excessively short, being produced laterally into an elongate and thin lamina, the first and last of these laminæ being larger than the others and capable of enclosing them in fan-like fashion. Pronotum quadrate, cut off at sides by head; mesonotum also deeply immersed within the posterior cavity of the head. Elytra moderately long. Metanotum with praescutum long and broad, broadest at base, truncate at tip; scuti narrow and elongate; scutellum subtriangular, with strongly sinuate sides and rounded apex; postlumbium very short; postscutellum long. Wings with radial vein meeting the costal margin beyond the middle, a detached vein behind radius and one in front of medius, also a narrowly detached branch behind medius. Tarsi three-jointed, the first joint of different form from the next two; claws absent. Oedeagus strongly bent, the under side being twice bent and the upper thrice; the last bend being a very strong reflexion at apical fourth; apex very acute.

Female. — Head distinctly rounded on sides, with a distinct anterior median area marked out, and slightly produced, tuberculate on either side of this area in front. The opening of the brood-canal is behind the middle of the exposed part of the cephalothorax and the surface between this opening and the apex is subconvex.

Type of genus — *P. australensis*, Perkins.

Geographical distribution of species. — Only one species is typical, the others probably representing distinct genera, but placed here until they are better known.

Parasites of leafhoppers of the genus *Tetigonia*:

1. *P. australensis*, Perkins. — Pl. 3, Fig. 4; Pl. 4, Figs. 3, 10, 14, 28. Queensland.

Halictophagus (Bruesia) australensis, Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Ass. Bull. 1, Pt. 3, p. 103, pl. 1, ff. 3, 5; pl. 2, ff. 1, 7, 9, 12; pl. 3, ff. 8, 9; pl. 4, ff. 1, 2 (1905).

Pentoxocera australensis, Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 81 (1908); Bull. U. S. Nat. Mus. no. 66, p. 158, pl. 13, ff. 8-12 (1909).

Parasites of leafhoppers of the genus *Hecalus* :

2. *P. phaeodes* Perkins.

Halictophagus (Bruesia) phaeodes, Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Ass. Bull. 1, Pt. 3, p. 103, pl. 3, f. 3 (1905).
Pentoxocera phaeodes, Pierce, Proc. Ent. Soc. Wash. p. 81 (1908); Bull. U. S. Nat. Mus. p. 159 (1909).

Queensland.

Parasites of leafhoppers of the genus *Paradorydium* :

3. *P. stenodes*, Perkins.

Halictophagus (Bruesia) stenodes, Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Ass. Bull. 1, Pt. 3, p. 104, pl. 3, f. 2 (1905).
Pentoxocera stenodes, Pierce, Proc. Ent. Soc. Wash. p. 81 (1908); Bull. U. S. Nat. Mus. p. 159 (1909).

Queensland.

Parasites of leafhoppers of the genus *Diedrocephala* :

4. *P. schwarzi*, Pierce.

Pentoxocera schwarzi, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 159, pl. 14, f. 11 (1909).

Guatemala.

2. SUBFAM. HALICTOPHAGINÆ, PERKINS

Halictophaginæ. Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Ass. Bull. 1, Pt. 3, p. 99 (1905).

Characters. — *Male.* — Prothorax band-like, not interrupted, either straight or arched forward. Wings with seven primary veins.

As far as known, this subfamily is parasitic on Fulgoridæ.

TABLE OF GENERA (MALES)

- 1a. Prothorax simple, not arched forward; wings with two distal detached veins between the radius and medius, cubitus lacking; medius broken, or with detached vein commencing just before the apex on its anal side 1. Genus HALICTOPHAGUS, Dale.
- 1b. Prothorax and mesothorax arched forward, fitting into excavation of head; oedeagus slender, basally arcuate, apically reflexed at a right angle and tapering to a point. Wings with seven primary veins; a short detached vein behind radius, medius with detached branches in front and behind 2. Genus NEOCHOLAX, Pierce.

TABLE OF GENERA (FEMALES)

- 1a. Transverse slit on cephalothorax narrow; thorax longer than head, gradually narrowed to base; side of head convex. 3. Genus MEGALECHTHRUS, Perkins.

I. GENUS HALICTOPHAGUS, DALE

Halictophagus. Dale, in Curtis, Brit. Ent. pl. 433 (1832); Pierce, Bull. U. S. Nat. Mus. no. 66, p. 156 (1909).

Characters. — *Male.* — Head broader than thorax, eyes very remote, prominent and coarsely faceted. Antennæ seven-jointed, the third to sixth laterally produced, and the seventh subequaling

the flabellum of the sixth. Prothorax and mesothorax short and simple; metathoracic praescutum and scuti subequal; scutellum short and rounded; postlumbium deeply concave; postscutellum very long and thick. Wings with seven primary veins, and a very short vein beyond the radius, another detached, but apparently arising from the medius, and a short vein arising just behind the medius. Tarsi three-jointed, without claws.

Female unknown.

Type of genus. — *H. curtisii*, Dale.

Geographical distribution of species. — Hosts unknown.

1. *H. curtisii*, Dale, in Curtis, Brit. Ent. p. 433 (1832). — **Pl. 5, Fig. 6.** England.
H. curtisii, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 156 (1909).

2. GENUS NEOCHOLAX, PIERCE

Neocholax. Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 160, 161 (1909).

Characters. — Head transverse. Mandibles short and acute, not reaching one another; maxillæ with first joint short, cylindrical, obliquely truncate at apex; second joint three times as long, stout, tapering, sensitive. Antennæ seven-jointed, similar to those of *Pentacladocera*. Pronotum and mesonotum arcuate, anteriorly fitting into excavation of head. Wings having radial vein meeting the costal margin beyond middle, medius basally united with radius for a short distance, a short detached vein behind radius, medius with narrowly detached branches in front and behind. Oedeagus slender, basally arcuate, apically reflexed at a right angle and tapering to a point.

Female. — Cephalothorax scarcely broader than long, with sides rounded, head convex.

Triungulinid. — Eight abdominal segments simple, ninth elongate, enclosing tenth, tenth bearing two very long bristles; each ventral segment bearing on its apical margin three short hairs arranged in longitudinal rows; venter of ninth segment with three pairs of bristles, of which the middle pair are shortest, the next longer, and the outer pair still longer.

Type of genus. — *N. jacobsoni*, Meijere.

Geographical distribution of species. — Parasites of fulgorid leafhoppers.

1. *N. jacobsoni*, Meijere. — **Pl. 4, Fig. 29; Pl. 5, Figs. 10-13.** Java.
Halictophagus jacobsoni, Meijere, Tijdschr. v. Ent. Vol. 51, p. 186, pl. 6,
ff. 1-7 (1908).
N. jacobsoni, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 161, pl. 14,
ff. 1-4 (1909).

3. GENUS MEGALECHTHRUS, PERKINS

Megalechthrus. Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Ass. Bull. 1, Pt. 3, p. 105 (1905);
Pierce, Bull. U. S. Nat. Mus. no. 66, p. 160 (1909).

Characters. — *Male.* — Antennæ seven-jointed, the last five being foliaceous.

Female. — Cephalothorax ovate, moderately elongate, the opening of the brood-canal near or in front of the middle, the small anterior median area distinct, a little produced in front, and tuberculate on either side of this area in front.

Type of genus. — *M. tryoni*, Perkins.

Geographical distribution of species. — Parasites of fulgorid leafhoppers of the genus *Platybrachys* (?).

1. *M. tryoni*, Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Ass. Bull. 1, Queensland.

Pt. 3, p. 106, pl. 3, f. 5 (1905).

M. tryoni, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 160 (1909).

SUPERFAM. ELENCHOIDEA

Elenchoidea. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 76 (1908); Bull. U. S. Nat. Mus. no. 66, p. 164 (1909).

Characters. — *Male.* — Tarsi two-jointed.

Female. — Tuberles of head more or less obsolete, ventral. Only three genital tubes entering brood-canal. Metathoracic spiracles not usually discernible, never prominent.

FAM. ELENCHIDÆ

Homopterobiæ. Saunders, Trans. Ent. Soc. Lond. p. 48 (1872).

Elenchinæ. Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Ass, Bull. 1, Pt. 3, p. 99 (1905).

Elenchidæ. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 77 (1908); Bull. U. S. Nat. Mus. no. 66, pp. 164, 165 (1909).

Characters. — *Male.* — Antennæ five-jointed, the third laterally produced, the fourth and fifth elongate. Tarsi two-jointed.

Female. — Same characterization as for superfamily.

TABLE OF GENERA (MALES)

- 1a. *Mouth parts consisting of mandibles and two-jointed maxillæ.*
- 2a. *Species large; first antennal joint elongate, second very short and transverse; frontal process not prominent; oral cavity broad, semicircular* 1. Genus DEINELENCHUS, Perkins.
- 2b. *Species small; first two antennal joints subequal; frontal process prominent; oral cavity triangular; wings having five primary veins from base, with one distal detached vein between the radius and medius, and two brief basal veins representing the cubitus and first anal.* 2. Genus ELENCHUS, Curtis.
- 1b. *Mouth parts consisting of mandibles, and two-jointed maxillæ, bearing on the first joint an elongate, knobbed, linear, chilinous filament; species small; oral cavity triangular; wings as in Elenchus, but without traces at base of cubitus and first anal* 3. Genus MECYNOCERA, Pierce.
- 1c. *Adult male unknown; described from puparium* 6. Genus COLACINA, Westwood.

TABLE OF GENERA (FEMALES)

1a. *Mandibles not evident.*

2a. *Opening of brood-canal a narrow transverse slit; cephalothorax rounded* 1. Genus DEINELENCHUS, Perkins.

2b. *Opening of brood-canal broad, with a narrow curtain overhanging it at base.*

3a. *Opening of brood-canal very broad, deeply cutting a rounded emargination into thorax* 3. Genus MECYNOCERA, Pierce.

3b. *Opening of brood-canal semicircular; spiracles visible at sides of the base of the head; cephalothorax broadly cordiform* 4. Genus ELENCHOIDES, Pierce.

1b. *Mandibles elongate oblique, obtuse; cephalothorax subquadrate; spiracles not prominent* 5. Genus PENTAGRAMMOPHILA, Pierce.

I. GENUS DEINELENCHUS, PIERCE

Deinelechus. Perkins, Rep. Exp. St. Hawaiian Sugar Planters' Ass. Bull. 1, Pt. 3, pp. 107, 108 (1905); Pierce, Bull. U. S. Nat. Mus. no. 66, p. 170 (1909).

Characters. — *Male.* — Head transverse, frontal process blunt, and not very prominent. Oral cavity broad, semicircular. Maxillæ two-jointed, sparsely pilose, the second joint narrower than the first and in the form of a curved blade. Antennæ five-jointed, first joint elongate, second very short and transverse, third long before its branch. Prothorax and mesothorax straight. Metathoracic præscutum elongate triangular, sides sinuate, apex rounded; scuti narrowly separated by præscutum; scutellum transverse, with all sides sinuate; postlumbium transverse, of different consistency from the other parts; postscutellum equalling the remainder of the metathorax in length. Tarsi two-jointed.

Female. — Cephalothorax nearly circular, very wide, the anterior margin simply and widely rounded, with no defined anterior median area, and without evident tubercles in front. Mandibles not evident. Between the opening of the brood-canal and the anterior margin there are two distinct areas marked out by impressed lines, which run backward to the opening of the brood-canal, as deep grooves on either side of a smooth slightly raised tubercle. Opening of brood-canal a narrow transverse slit.

Type of genus. — *D. australensis*, Perkins.

Geographical distribution of species. — Parasites of leafhoppers of the genus *Platybrachys*.

1. *D. australensis*, Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Ass. Queensland. Bull. 1, Pt. 3, pp. 107-109, pl. 3, f. 3. — PI. 3, Fig. 6; PI. 4, Fig. 7.
D. australensis, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 170 (1909).

2. GENUS ELENCHUS, CURTIS

Elenchus. Curtis, Brit. Ent. Vol. 8, p. 385 (1831); Pierce, Bull. U. S. Nat. Mus. no. 66, p. 165 (1909).

Characters. — *Male.* — Head transverse, frontal process prominent. Antennæ five-jointed, first two antennal joints subequal, third laterally produced as a long flat appendage, fourth elongate flattened, fifth twice as long as fourth and exceeding apex of third. Prothorax short, mesothorax longer. Metathoracic scutellum small, postscutellum elongate. Wings having five primary veins from base, with

one distal detached vein between the radius and medius, and two brief basal veins representing the cubitus and first anal. Tarsi two-jointed.

Female unknown.

Type of genus. — *E. walkeri*, Curtis.

Geographical distribution of species. — Parasites of leafhoppers, probably of the genus *Liburnia* (*E. tenuicornis* is known to be).

1. <i>E. melanias</i> , Perkins, Fauna Hawaii. Vol. 3, Pt. 6 (Dec. 17, 1910). var. <i>silvestris</i> , Perkins, ibidem (1910).	Oahu, Hawaii.
2. <i>E. templetonii</i> , Westwood, Trans. Ent. Soc. Lond. Vol. 1, pp. 173, 174, pl. 17, f. 15 (1835). — Pl. 5, Fig. 4.	Oahu, Hawaii. Mauritius.
3. <i>E. tenuicornis</i> , Kirby. <i>Stylops tenuicornis</i> , Kirby, Trans. Linn. Soc. Lond. Vol. 11, Pt. 2, pp. 233, 234 (1815). <i>E. tenuicornis</i> , Saunders, Trans. Ent. Soc. Lond. p. 32 (1872); Pierce, Bull. U. S. Nat. Mus. no. 66, p. 166 (1909).	England.
4. <i>E. walkeri</i> , Curtis. <i>Stylops walkeri</i> , Curtis, Guide Arrang. Insects, p. 452 (1829). <i>E. walkeri</i> , Curtis, Brit. Ent. Vol. 8, p. 385 (1831); Pierce, Bull. U. S. Nat. Mus. pp. 156, 157 (1909).	England, Ireland.

3. GENUS MECYNOCERA, PIERCE

Mecynocera. Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 81 (1908); Bull. U. S. Nat. Mus. no. 66, p. 168 (1909).

Characters. — *Male*. — Head transverse. Eyes with comparatively few hairs, and ommatidia close. Mandibles short, stout, acute; maxillæ two-jointed, with a chitinous, knobbed filament from the middle of the first joint. Antennæ five-jointed, the first two joints cylindrical; first shorter than second; third short, laterally produced in a very long sensitive flabellum; fourth and fifth elongate, the latter surpassing the flabellum of the third by one-half its own length. Prothorax narrow, transverse; mesothorax longer; elytra long and slender and enlarged paddle-shape at apex. Metathorax with præscutum elongate goblet-shaped, convexly rounded in front, sides concave, converging to a peduncle, then suddenly widened behind scuti as the base of a goblet, apically truncate; scuti elongate suboblong; scutellum transverse, broadly truncate in front, posterior angles laterally produced, convexly rounded at apex; postlumbium subcrescent shape, of different consistency from the remaining parts; postscutellum broad, pubescent, convex. Wings with five primary veins, with a short detached vein between radius and medius. Tarsi two-jointed. Ædeagus cylindrical, slightly bent at middle, thence tapering to acute apex, not reflexed near apex.

Female. — Cephalothorax without sign of mandibles; opening of brood-canal very broad, deeply cutting a rounded emargination into thorax, with a narrow curtain overhanging it at base.

Type of genus. — *M. koebelei*, Pierce.

Geographical distribution of species. — Parasites of leafhoppers of the genus *Liburnia*.

1. *M. koebelei*, Pierce, Proc. Ent. Soc. Wash. Vol. 9, p. 81 (1908). — **Pl. 3**, Ohio.

Fig. 5; Pl. 4, Figs. 4, 6, 15, 30, 39, 43.

Elenchus tenuicornis, Perkins, Rep. Exp. Stat. Hawaiian Sugar Planters' Ass. Bull. 1, Pt. 3, pp. 106, 107, pl. 1, ff. 6, 8; pl. 2, ff. 3-6, 11, pl. 3, f. 4 (1905).

M. koebelei, Pierce, Bull. U. S. Nat. Mus. no. 66, pp. 168, 169; text fig. 3, nos. 15, 16; pl. 15, ff. 2-5 (1909).

4. GENUS ELENCHOIDES, PIERCE

Elenchoides. Pierce, Bull. U. S. Nat. Mus. no. 66, p. 167 (1909).

Characters. — *Female.* — Three genital tubes enter brood-canal. Cephalothorax broadly cordiform. Opening of brood-canal semicircular, with a narrow curtain extending forward. Spiracles present at sides of the base of the head. The single pair of lobes are approximate, but not contiguous.

Type of genus. — *E. perkinsi.* Pierce.

Geographical distribution of species. — Parasites of leafhoppers of the genus *Perkinsiella*.

1. *E. perkinsi*, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 167, pl. 15, f. 6 (1909). Fiji.

Pl. 4, Fig. II.

Elenchus tenuicornis, Muir, Rep. Exp. St. Hawaiian Sugar Planters' Ass.
Bull. 2, pp. 6-9, pl. 1 (1906).

5. GENUS PENTAGRAMMAPHILA, PIERCE

Pentagrammaphila. Pierce, Bull. U. S. Nat. Mus. no. 66, p. 169 (1909).

Characters. — *Female.* — Cephalothorax subquadrate; spiracles at basal angles not prominent; apex truncate, with rounded lobe in front of mouth; mandibles elongate, oblique, obtuse.

Type of genus. — *P. uhleri* Pierce.

Geographical distribution of species. — Parasites of leafhoppers of the genus *Pentagramma*.

1. *P. uhleri*, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 169 (1909). Dacota.

6. GENUS COLACINA, WESTWOOD

Colacina. Westwood, Trans. Ent. Soc. Lond. pp. 185-187 (1877).

Characters. — The genus is only known from the cephalotheca of the male puparium, which however is very distinctly different from that of other genera. Careful descriptions of this cephalotheca have been given by the present writer in all cases where it is known.

Type of genus. — *C. insidiator*, Westwood.

Geographical distribution of species. — Parasites of fulgorid leafhoppers of the genus *Epora*.

1. *C. insidiator*, Westwood, Trans. Ent. Soc. Lond. pp. 185-187, figs. (1877). Sarawak, Borneo.

— **Pl. 5, Fig. 9.**

C. insidiator, Pierce, Bull. U. S. Nat. Mus. no. 66, p. 171, pl. 15, f. 7 (1909).

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Distribution of the STREPSIPTERA (Wallace's Life Zones)

GENERA	NEARCTIC				NEOTROPICAL				PALÆARCTIC				ETHIOPIAN				ORIENTAL				AUSTRALIAN				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Mengea	I																
Triozocera	I	I																		
Mengenilla	I															
Austrostylops	I		
Myrmecolax	I						
Cænocholax	I																		
Stylops	2	7	19	2	...	...	...	...	8	1	...	3												
Parastylops	I					
Hylechthrus	3															
Halictoxenos	2	6	.	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	2		
Apractelytra	1																						
Crawfordia	2	2																						
Xenos	I	I	II	...	...	...	...	...	I	I														
Vespæxenos	I	2				
Belonogastechthrus	I												
Pseudoxenos	II	...	...	...	...	...	...	4															
Monobiaphila	I																						
Tachytixenos							I						
Eupathocera	2	3	...	...	...	...	...	2																
Ophthalmochlus	3	I	...	I																I		
Sceliphronechthrus	I																		
Paraxenos	1																
Stichotrema	I	
Diozocera	I																	
Anthericoma	I																							
Pentacladocera	I		
Agalliaphagus	I																							
Pentozoe											I						
Pentozocera	I	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3		
Halictophagus	I																
Neocholax	I						
Megalechthrus	I				
Deinelenchus	I		
Elenchus	2	...	...	...	...	1	...	...	...	...	...	...	...	...	I		
Mecynocera	I																						
Elenchoides	I	
Pentagrammaphila	I																							
Colacina	I		1	1			
Total.	3	17	59	2	—	1	3	3	16	11	—	1	I	—	—	1	1	2	1	8	—	7	1	2	

INDEX

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<i>rubiginosi</i> , Pierce (<i>Xenos</i>)	5, 26	<i>subcandidæ</i> , Pierce (<i>Stylops</i>)	4, 17	* <i>vitiensis</i> , Kirk. (<i>Perkinsiella</i>)	6
<i>rubiginosus</i> , Lepel. (<i>Polistes</i>)	26	* <i>subtilis</i> , Smith (<i>Andrena</i>)	4	* <i>vittatifrons</i> , Uhl. (<i>Pentagramma</i>)	6
<i>rudbeckiae</i> , Pierce (<i>Crawfordia</i>)	5, 23	* <i>subtilis</i> , Walk. (<i>Epora</i>)	6	<i>vulgaridis</i> , Pierce (<i>Eupathocera</i>)	6, 29
* <i>rudbeckiae</i> , Rob. (<i>Pseudopanurgus</i>)	5	<i>swenki</i> , Pierce (<i>Stylops</i>)	4, 17	* <i>vulgaris</i> , Cress. (<i>Sphex</i>)	6
		*Tachytex	6, 29		

	Pages		Pages		Pages
<i>walkeri</i> , Curt. (Elenchus)	44	Xenidæ	2, 12, 19, 46	(Xenus)	24
(<i>walkeri</i> , Curt.) (<i>Stylops</i>)	44	(Xenides)	24	* <i>Xerophloea</i>	6
<i>westwoodi</i> , Templ. (<i>Ophthalmochlus</i> Homilops)	6, 31	Xeninæ	19, 23, 46	<i>zavattarii</i> , Pierce (Belonogastech- thrus)	5, 26
(<i>westwoodi</i> , Templ.) (<i>Xenos</i>)	31	Xenini	23, 24, 46	<i>zephyri</i> , Pierce (<i>Halictoxenos</i>)	5, 21
(<i>wheeleri</i> , Pierce) (<i>Acroschismus</i>)	26	* <i>xenoferus</i> Rohwer (<i>Tachytes</i>)	6	* <i>zephyrus</i> , Pierce (<i>Halictus Chlo-</i> <i>ralictus</i>)	5
<i>wheeleri</i> , Pierce (<i>Xenos</i>)	5, 26	Xenoidea	7, 12, 46		
		Xenos	5, 23, 24, 46, 48		

EXPLANATION OF PLATES

PLATE 1

Fig. 1. *Triosocera mexicana*, Pierce, ♂ (original).
— 1b. Same, natural size.
— 2. *Myrmecolax nietneri*, Westwood, ♂ (original).
— 2b. Same, natural size.
— 3. *Caenocholax fenyesi*, Pierce, ♂ (original).
— 3b. Same, natural size.
— 4. *Stylops crawfordi*, Pierce, ♂ (original).
— 4b. Same, natural size.
— 5. *Xenos vesparum*, Rossi, ♂ (original).
— 5b. Same, natural size.

PLATE 2

Fig. 1. *Eupathocera lugubris*, Pierce, ♂ (original).
— 1b. Same, natural size.
— 2. *Ophthalmochlus duryi*, Pierce, ♂ (original).
— 2b. Same, natural size.
— 3. *Halictoxenos jonesi*, Pierce, ♂ (original).
— 3b. Same, natural size.
— 4. *Crawfordia pulvinipes*, Pierce, ♂ (original).
— 4b. Same, natural size.
— 5. *Diozocera insularum*, Pierce, ♂ (original).
— 5b. Same, natural size.

PLATE 3

Fig. 1. *Anthericoma barberi*, Pierce, ♂ (original).
— 1b. Same, natural size.
— 2. *Pentacladocera schwarzi*, Perkins, ♂ (original).
— 2b. Same, natural size.

Fig. 3. *Pentozoe peradeniya*, Pierce, ♂ (original).
 — 3b. Same, natural size.
 — 4. *Pentosocera australensis*, Perkins, ♂ (original).
 — 4b. Same, natural size.
 — 5. *Mecynocera koebelei*, Pierce, ♂ (original).
 — 5b. Same, natural size.
 — 6. *Deinelenchus australensis*, Perkins, ♂ (original).
 — 6b. Same, natural size.

PLATE 4

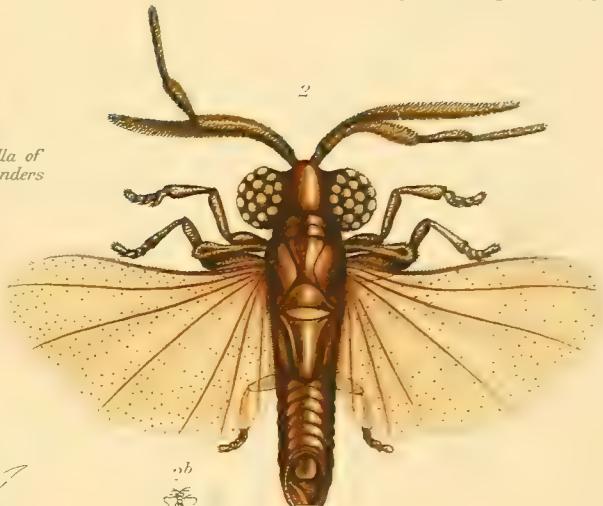
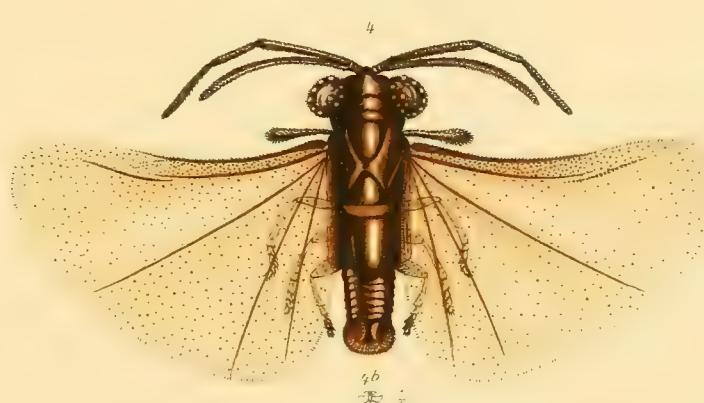
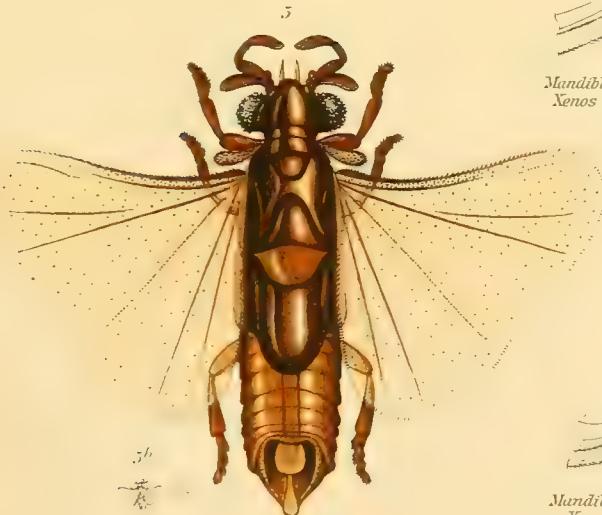
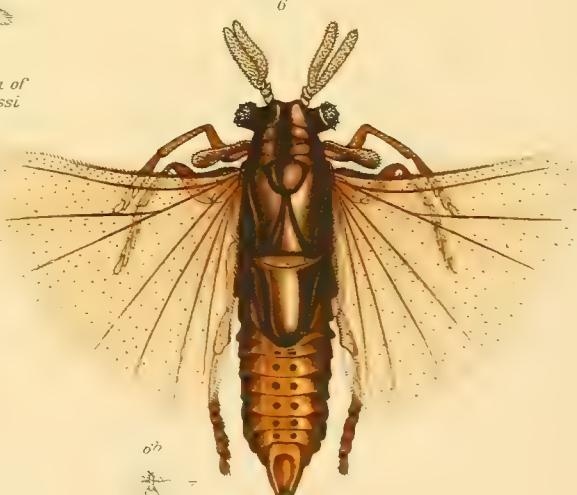
Fig. 1. *Xenos pallidus*, Brues, triungulinid (after Brues).
 — 2. Same, ♀ cephalothorax (after Brues).
 — 3. *Pentozocera australensis*, Perkins, triungulinid (after Perkins).
 — 4. *Mecynocera sp.*, triungulinid (after Perkins).
 — 5. *Xenid sp.*, triungulinid (after Perkins).
 — 6. *Mecynocera koebelei*, Pierce, ♀ cephalothorax (after Perkins).
 — 7. *Deinelenchus australensis*, ♀ cephalothorax (after Perkins).
 — 8. *Megalechthrus tryoni*, Perkins, ♀ cephalothorax (after Perkins).
 — 9. *Agalliaphagus americanus*, Perkins, ♀ cephalothorax (after Perkins).
 — 10. *Pentosocera australensis*, Perkins, ♀ cephalothorax (after Perkins).
 — 11. *Elenchoides perkinsi*, Pierce, ♀ cephalothorax (after Muir).
 — 12. *Pentacladocera schwarzi*, Perkins, ♂ face (after Perkins).
 — 13. *Pentozocera australensis*, Perkins, ♂ face (after Perkins).
 — 14. *Mecynocera koebelei*, Pierce, ♂ face (after Perkins).
 — 15. *Triozocera mexicana*, Pierce, ♂ œdeagus (original).
 — 16. *Meugenilla chobautii*, Hofeneder, ♂ œdeagus (after Hofeneder).
 — 17. *Myrmecolax nietneri*, Westwood, ♂ œdeagus (original).
 — 18. *Caenocholax fenyesi*, Pierce, ♂ œdeagus (original).
 — 19. *Stylops crawfordi*, Pierce, ♂ œdeagus (original).
 — 20. *Halictoxenos jonesi*, Pierce, ♂ œdeagus (original).
 — 21. *Apractelytra schwarzi*, Pierce, ♂ œdeagus (original).
 — 22. *Crawfordia pulvinipes*, Pierce, ♂ œdeagus (original).
 — 23. *Xenos vesparum*, Rossi, ♂ œdeagus (original).
 — 24. *Tachytixenos indicus*, Pierce, ♂ œdeagus (original).
 — 25. *Eupathocera lugubris*, Pierce, ♂ œdeagus (original).
 — 26. *Ophthalmochilus duryi*, Pierce, ♂ œdeagus (original).
 — 27. *Pentozocera australensis*, Perkins, ♂ œdeagus (after Perkins).
 — 28. *Neocholax jacobsoni*, Meijere, ♂ œdeagus (after Meijere).
 — 29. *Mecynocera koebelei*, Pierce, ♂ œdeagus (original).
 — 30. *Triozocera mexicana*, Pierce, ♂ antenna (original).
 — 31. *Mengenilla chobautii*, Hofeneder, ♂ antenna (after Hofeneder).
 — 32. *Caenocholax fenyesi*, Pierce, ♂ antenna (original).
 — 33. *Hylechthrus rubi*, Saunders, ♂ antenna (after Saunders).
 — 34. *Stylops crawfordi*, Pierce, ♂ antenna (original).
 — 35. *Xenos pallidus*, Brues, ♂ antenna (original).
 — 36. *Diozocera insularum*, Pierce, ♂ antenna (original).

Fig. 38. *Anthericoma barberi*, Pierce, ♂ antenna (original).
 — 39. *Mecynocera koebeliae*, Pierce, ♂ antenna (original).
 — 40. *Triozyocera mexicana*, Pierce, ♂ tarsus (original).
 — 41. *Xenos pallidus*, Brues, ♂ tarsus (original).
 — 42. *Anthericoma barberi*, Pierce, ♂ tarsus (original).
 — 43. *Mecynocera koebeliae*, Pierce, ♂ tarsus (original).
 — 44. *Pentosoe peradeniya*, Pierce, ♂ oedeagus (original).

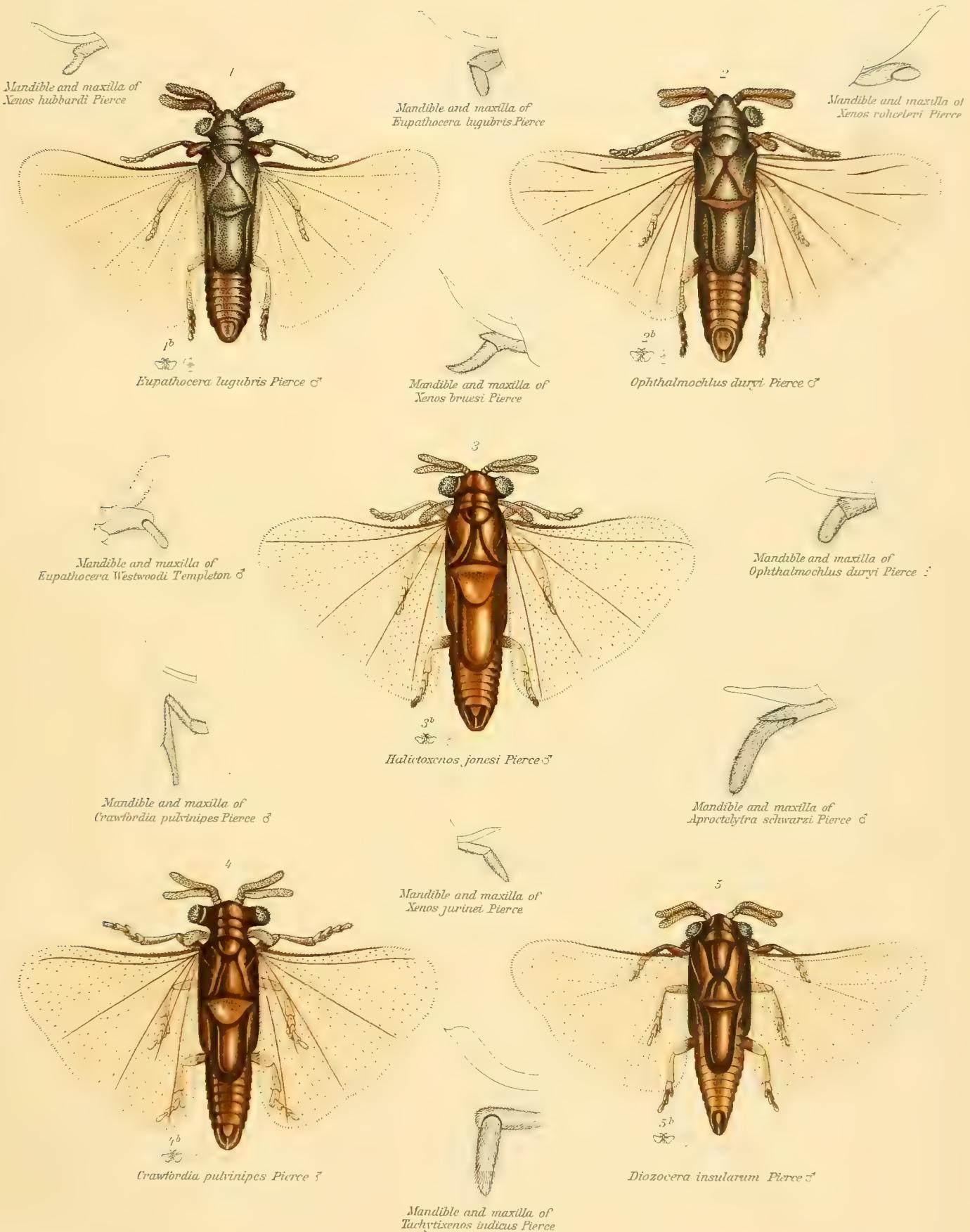
PLATE 5

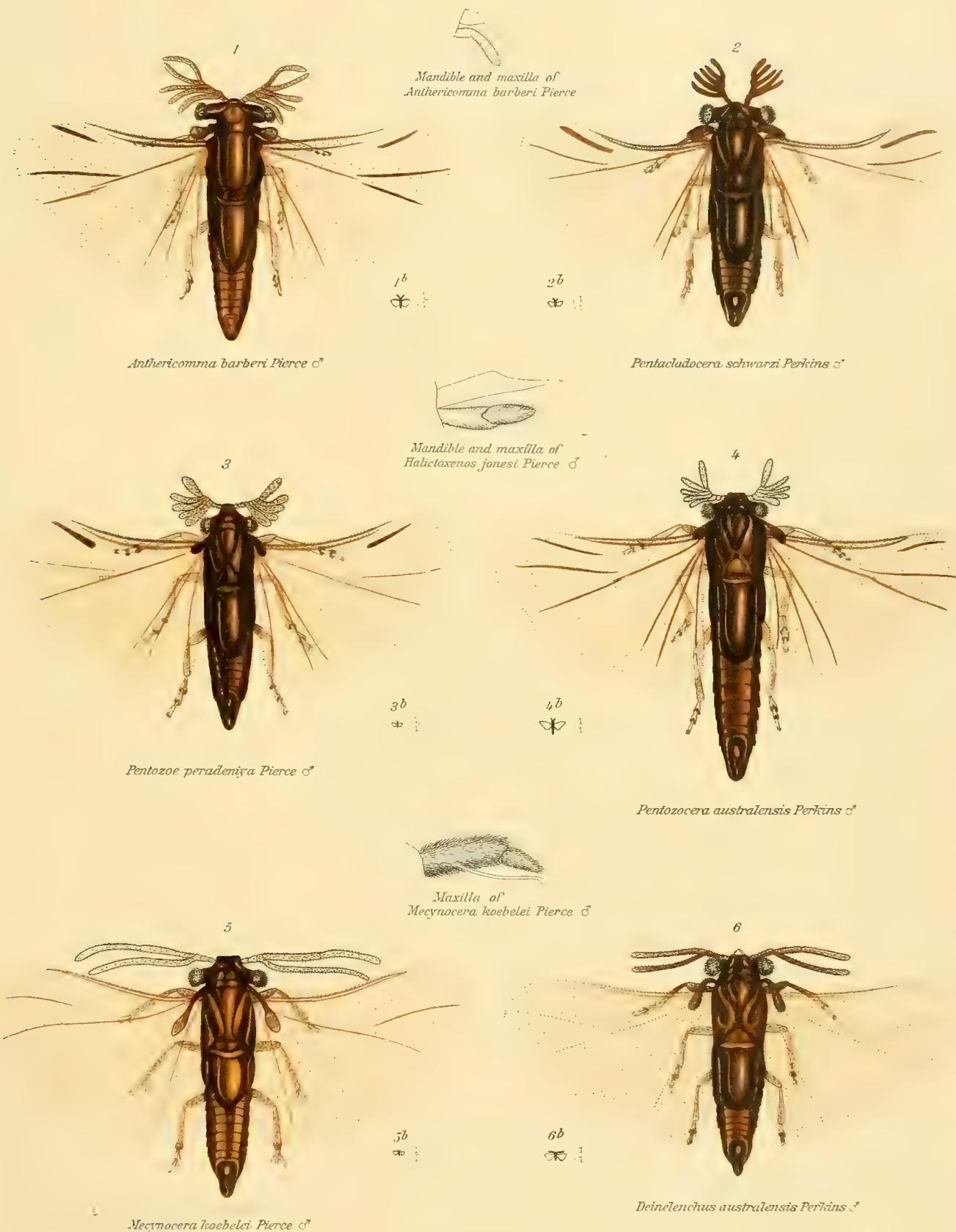
Fig. 1. *Mengea tertaria*, Menge, ♂ (after Menge).
 — 2. Same, ♂ face (after Menge).
 — 3. *Hylechthrus rubi*, Saunders, ♂ (after Saunders).
 — 4. *Elenchus templetonii*, Westwood, ♂ (after Westwood).
 — 5. *Eupathocera westwoodi*, Templeton, ♂ (after Templeton).
 — 6. *Halictophagus curtisii*, Dale, ♂ (after Curtis).
 — 7. *Pseudoxenos schaumii*, Saunders, ♂ (after Saunders).
 — 8. *Paraxenos erberi*, Saunders, ♂ wing (after Saunders).
 — 9. *Colacina insidiator*, Westwood, ♂ cephalotheca (after Westwood).
 — 10. *Neocholax jacobsoni*, Meijere, ♂ antenna (after Meijere).
 — 11. Same, ♂ mandible and antenna (after Meijere).
 — 12. Same, ♀ cephalothorax (after Meijere).
 — 13. Same, ♂ wing (after Meijere).
 — 14. *Polistes gallicus*, Linnæus, parasitized by *Xenos vesparum*, Rossi (original by Hofeneder).
 — 15. Same, side view (original by Hofeneder).
 — 16. *Parastylops flagellatus*, Meijere, ♂ antenna (after Meijere).
 — 17. Same, ♂ metathorax (after Meijere).
 — 18. Same, ♂ wing (after Meijere).

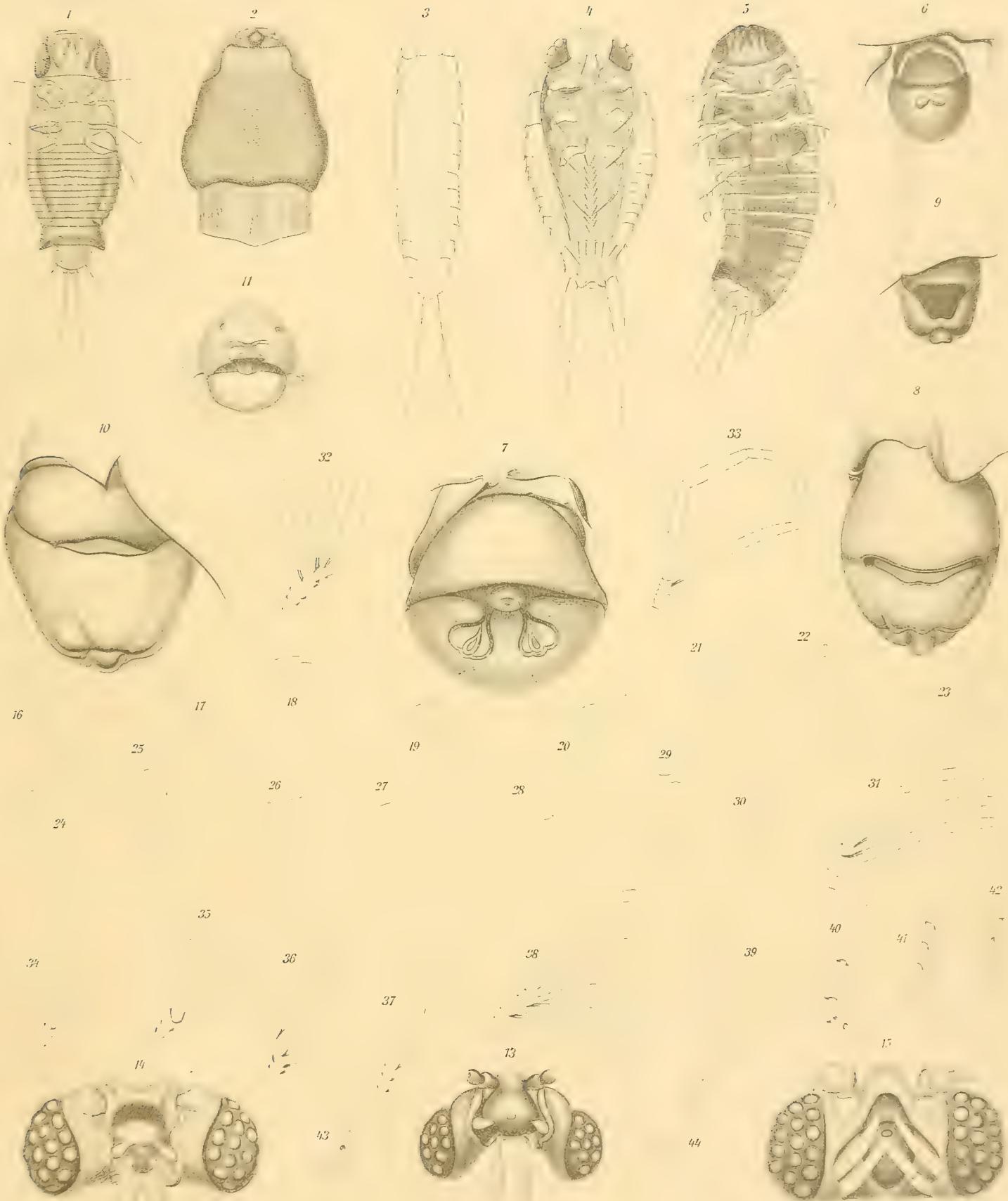
Dallas, Texas, U. S. A., 15th May 1911.

Mandible and maxilla of *Hylechthrus rubi* SaundersMandible and maxilla of *Xenos pallidus texensis* PierceMandible and maxilla of *Caenocholax fenygesi* Pierce ♂Mandible and maxilla of *Xenos pecosensis* PierceMandible and maxilla of *Xenos respirum* RossiMandible and maxilla of *Xenos bowditchi* PierceMandible and maxilla of *Xenos bowditchi* Pierce

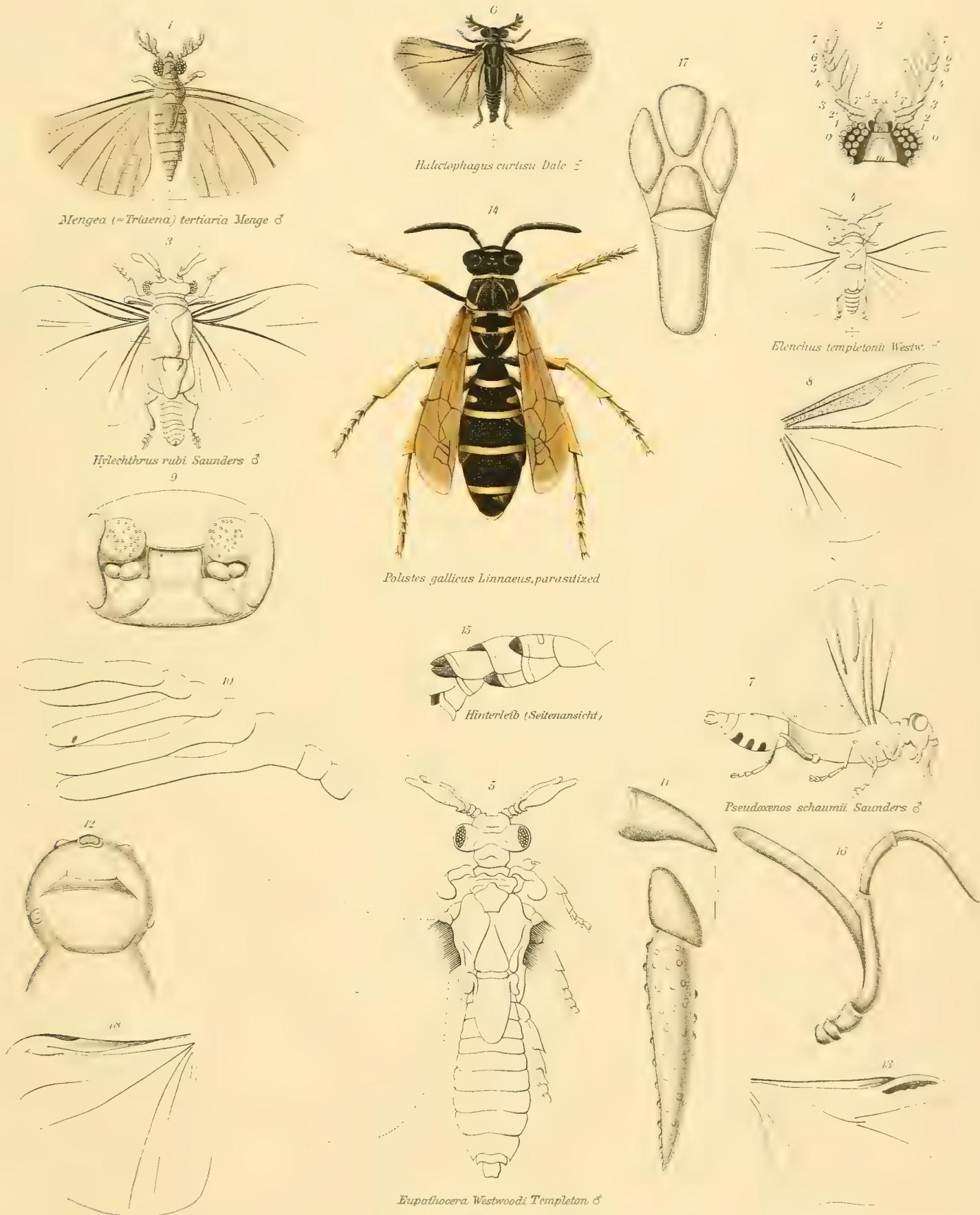
FAM. MENGEIDÆ, MYRMECOLACIDÆ, HYLECHTHRIDÆ, STYLOPIDÆ, XENIDÆ







GENERAL CHARACTERS, OEDEAGUS, ANTENNA, TARSUS



FAM. MENGEIDÆ, HYLECHTHRIDÆ, STYLOPIDÆ, HALICTOPHAGIDÆ, ELENCHIDÆ







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